

THE  
DECLINE IN THE BIRTH-RATE.

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AN ESSAY IN STATISTICS.

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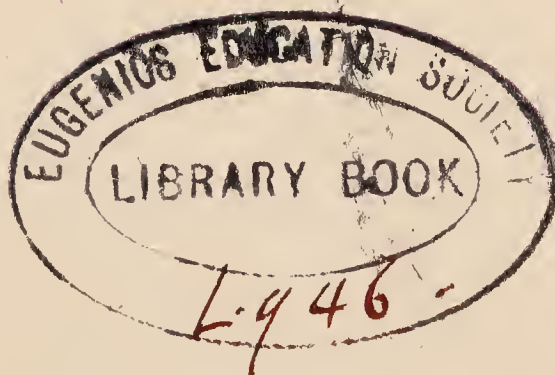
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THE DECLINE IN THE BIRTH-RATE OF  
NEW SOUTH WALES.



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THE  
DECLINE IN THE BIRTH-RATE  
OF NEW SOUTH WALES

AND  
  
OTHER PHENOMENA OF CHILD-BIRTH.

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AN ESSAY IN STATISTICS

BY  
  
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# THE DECLINE IN THE BIRTH-RATE OF NEW SOUTH WALES.

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## Introduction.

THERE is hardly any branch of statistical inquiry that has been so greatly neglected in English-speaking countries as that which treats of the phenomena of child-bearing. Much, indeed, has been written on the subject of the decline in the birth-rate, and many and various theories have been advanced to account for that decline, but, so far as statistics are concerned, there has been little systematic attempt to advance beyond commonplace comparisons of the number of births and the population of the State or town in which the births occur ; so that the present essay, incomplete as it is, will do something towards removing a serious defect in an interesting and important branch of vital statistics.

The pioneer work on the subject of child-bearing is that of Dr. Matthews Duncan, entitled "Fecundity, Fertility, and Sterility," published in Edinburgh nearly forty years ago. The book dealt with the 16,593 legitimate births occurring in the cities of Edinburgh and Glasgow in the year 1855. Dr. Duncan's field of observation was thus very restricted, and not a few of his conclusions, being based on insufficient data, are faulty, but his arguments are in the main correct, and deservedly received a large amount of attention.

The investigation, of which the results are here presented, covers a very much wider field. The author has had access to the registrations of births, deaths, and marriages in New South Wales since the year 1856, when the system of state registration came into operation ; for his present work, however, attention is restricted, so far as births are concerned, to the period 1891 to 1900, during which decade 356,496 children were born, and in regard to deaths, to the twenty years from 1881 to 1900, in which period the deaths of 43,657 married women were registered.

The birth records give the ages of the parents of each child born, the period elapsing since marriage, and their previous issue ; the death records show, amongst other things, for each married woman, the age of the deceased and of her husband, the duration of their marriage, the number of issue both living and dead, and the cause of death. At the census, besides the usual particulars obtained at periodical enumerations of the people, viz., in regard to age, birth-place, religion, occupation, conjugal condition, education, &c., special inquiry was made of all married persons concerning the duration of their marriage, and the number of their children.

The facts obtained from these three independent sources form the groundwork of the information herein presented. Few assumptions of any kind have been made, and these only of an obvious character; while the deductions have, in all cases, substantial backing in actual facts, for the most part appearing in one part or other of this volume. Where it has been thought necessary, the figures have been subjected to actuarial adjustment in order to correct errors and misstatements in regard to ages; this, as all persons dealing with vital statistics soon discover, is a precaution most necessary to take where women are the subject of discussion.

There is nothing as regards the phenomena of child-birth in which the Australian states can be said to differ in any material way from other civilised countries. The results here presented, can, therefore, be considered, if not of universal application, as applicable to communities under conditions like unto those prevailing in Australia.



## A New Country and a Declining Birth-rate.

AUSTRALIA, with its large and sparsely-populated territory, and with its industries in process of rapid development, might reasonably be pictured as an ideal land, wherein the people would prove fruitful and multiply. Such, indeed, was the promise of the early years of settlement. Present indications, however, give no hope of a teeming population springing from Australasian parents, for the birth-rate in all the states has declined very greatly, especially during the last fifteen years, and when compared with the total population, the births in three of them are proportionately less numerous than in any European country, France alone excepted.

The rates for the seven states in 1901 were as follows, the figures indicate the number of children born alive per thousand of the total population :—

Western Australia .....	30·49	New Zealand .....	26·30
Tasmania .....	28·39	Victoria .....	25·77
Queensland .....	28·36	South Australia .....	25·09
New South Wales .....	27·60		

The birth-rate of France in recent years has averaged 22 per thousand, or only 3·09 below the lowest Australian rate.

Ratios based on the whole population are as a rule unsatisfactory. More trustworthy results are obtained by comparing the number of women of child-bearing age and the total births in wedlock. Taking the married women under the age of 45 years, it is found that at the present time (1901), the births in New South Wales do not average more than 235 per thousand, while as recently as 1886 their number was 339, so that there has been a decline in fifteen years of very nearly one-third. This important development is likely to be attended with very serious results, both social and economic, some of which are already beginning to show themselves.

The Census of 1901 disclosed the fact that in New South Wales the children under 5 years of age were less in number than at the previous Census, and in some of the other states the children, both under 5 and under ten years, were also less numerous. Taking Australia and New Zealand together, the fall in the birth-rate is such that there are annually fewer births by nearly 20,000 than would have occurred if the rates prevailing as late as ten years ago had been maintained. A striking instance of the decline may be drawn from New South Wales. In 1887 there were in that state 112,546 married women under the age of 45 years, in 1901 there were 149,247, yet the number of children born was about the same in each year. From New Zealand comes the cry that the children are not sufficiently numerous to fill the schools, and in other states a like condition may be expected to arise, seeing the reduction in the number of children below the school age.

From the standpoint of public polity the decline in the birth-rate is an extremely serious matter. If the influx of population from outside Australia, which is at present very slight, were to cease altogether, the birth and death rates would probably adjust themselves as follows :—

Birth-rate .....	27·0	per thousand of population.
Death-rate .....	12·2	„ „
Natural increase.....	14·8	„ „



Ten years ago the natural increase was 20·3, and thirty years ago, 24 per thousand. It is true that part of this falling off is due to the cessation of the immigration of young married women ; but for ten years and more the movement of population has been normal, and the decline in the natural increase may be assumed to be a fixed condition of Australian social progress. Nor is the decline peculiar to any particular state, for though actual figures can be given for the four Eastern states only, there is every probability that in the States of South Australia, Western Australia, and Tasmania the present rates are greatly below what obtained as recently as 1891. The following were the legitimate birth-rates per thousand married women under 45 years of age in each division of Australasia for the year 1901 :—

Victoria.....	228·6	New Zealand .....	246·1
New South Wales .....	235·3	Queensland .....	254·0
South Australia .....	235·9	Tasmania .....	260·0
Western Australia .....	243·9		

In the year 1891 the average for Australasia was about 276 per thousand, while the average of the foregoing rates is 239.

For New South Wales, Victoria, Queensland, and New Zealand the rates since 1861, in the case of the first two, and since 1881 for the others, are shown in the following table ; as in the statement just given the rates are for married women under 45 years of age.

Year.	New South Wales.	Victoria.	Queensland.	New Zealand.
1861.....	340·8	302·2	.....	.....
1871.....	331·5	298·2	.....	.....
1881.....	336·3	298·4	316·2	312·2
1891.....	288·7	297·7	327·7	275·7
1901.....	235·3	228·6	254·0	246·1

The experience of these states is very similar ; but to some the contraction in the birth-rate came earlier than to others. The following figures, which are deduced from the New South Wales experience, may be taken as exemplifying the condition of the states as a whole. They give the number of legitimate births to every thousand married women under the age of 45 years during a period of twenty-one years ; and from the persistent and regular character of the fall, it may be surmised that the minimum has not even yet been reached, and a further decline may be looked for.

Year.	Rate.	Year.	Rate.	Year.	Rate.	Year.	Rate.
1881	336·3	1887	333·4	1892	286·4	1897	241·3
1882	330·5	1888	328·8	1893	281·4	1898	229·6
1883	333·6	1889	304·2	1894	267·1	1899	226·6
1884	346·2	1890	304·7	1895	260·3	1900	227·1
1885	341·7	1891	288·7	1896	240·4	1901	235·3
1886	338·9						

There appears nothing incongruous in a declining birth-rate in an old civilisation, especially in one afflicted with the incubus of militarism ; but the extension of the phenomenon to new countries, where population is so much desired, is novel and astonishing, and claims the deepest attention.

## Marriage Age.

THE ages at which women have married in New South Wales range from 14 to 98 years, and the ages of men from 17 to 82 years. These figures have, however, little practical significance, so far, at least, as concerns the question herein discussed, the chief interest of which lies in the age at which women marry within the period of child-bearing. The average age of women at marriage during the last five years was 23·95, and of men 28·87, showing an average difference of 4·92 years between husband and wife. The age at marriage amongst women has been gradually increasing, and is now sixteen months later than it was in 1885. Taking the last four quinquennial periods, the age at marriage was :—

	Years.
1881-1885 .....	22·64
1886-1890 .....	22·84
1891-1895 .....	23·26
1896-1900 .....	23·95

The causes leading to the postponement of marriage are both ethical and economic, and a discussion of them lies outside the purpose of this inquiry, which deals only with observed phenomena. The effect of the postponement is a practical question which will be referred to at length in a later chapter. It has to be considered in conjunction with the reduction in the child-bearing period, which it will be found has taken place during recent years, and also with the growth of a custom, amongst a large section of the population, of ante-nuptial intercourse, which makes the postponement of marriage indicated by the registrations more apparent than real.

Women living in towns usually marry later than those in the rural districts. Taking Sydney as the representative of the urban districts, the average age at which women married was found, at the census of 1901, to be 23·42 years, compared with 22·89 years for the rest of the State. In some parts of the State, especially where dairying and farming on a small scale are carried on, the age at marriage is lower than in other districts; in coal-mining districts it is also low; in the other mining districts the age at marriage is greater than amongst women in the urban districts.

Women of Australian birth comprised, at the Census of 1901, about 71 per cent. of the married population of the State, and their proportion is daily increasing. Immigration from Europe has of recent years been very restricted, and is likely to continue so, and as years go by the mothers of Australian-born children will themselves be more and more of Australian birth. It is, therefore, important to distinguish the average marriage age of Australian women compared with that of women of other origin. This, for women living in the state at the date of the census of 1901, was :—

Birthplace.	Age at Marriage.
Australia ... ..	23·35 years.
England or Wales .....	25·27 „
Ireland .....	26·30 „
Scotland .....	26·51 „

The average age at marriage of other than Australian born women is about 25·65 years, or 2·3 years higher than that of Australian women. This is a very important difference, and, as will presently appear, is equivalent—other



things being equal—to the probability of sixty more children being born to one hundred Australian women than to a like number of women of European extraction.

It is difficult to see how the religion of a woman can affect her age at marriage, except that, amongst religions which strictly enjoin upon both men and women the vital principle of marriage within their own communion, there may be in some cases a postponement, owing to the non-appearance of an eligible *parti* of the right religion. The faiths most strict in regard to marriage of their followers within their own fold are the Roman Catholic and the Jewish, and, strange to say, it is amongst these that the largest proportion of what are termed mixed marriages occur. Whatever effect adherence to the commands of a church may have on the minds of isolated individuals, the result upon the whole body of persons in these communions seems to be slight indeed, for, as the following statement shows, there is little difference between the average age at marriage of the members of any religious body. The figures refer to women only.

Religion.	Average Age at Marriage.
Jews .....	22·93 years.
Methodist .....	23·31 „
Church of England ..	23·37 „
Roman Catholic .....	23·82 „
Baptist .....	24·16 „
Presbyterian.....	24·18 „
Congregational.....	24·18 „

The age of the husband, as will presently appear, is of far less importance than that of the wife in all matters affecting child-bearing, and if the wife's age were to remain the same, it would require a very considerable addition to the average age of the husband to affect appreciably the birth-rate. During the last ten years the average age at marriage for men has increased from 28·65 years to 28·87 years, too small a difference, in any case, to be worthy of consideration.



## Ante-nuptial Conception.

No intelligible discussion of the problems relating to child-birth can be entered on, without a proper understanding of the extent to which the birth and marriage rates are affected by ante-nuptial conceptions. The social conditions which lead to these conceptions affect a considerable portion of the Australasian population, but whether to a greater or less degree than in other countries cannot be determined, as reliable statistics on the subject are almost entirely wanting. It is convenient in dealing with ante-nuptial conceptions to discuss, at the same time, certain aspects of illegitimacy, although it must be admitted that the two are not necessarily different phases of the same question.

During the ten years 1891–1900, there were in New South Wales 85,391 marriages, and of these, 22,094 were contracted after conception had taken place. It will be thus seen that 259 in every thousand marriages are, in regard to fecundity, so to speak, prejudiced, that is to say, the probability of there being issue thereto is actually assured before the marriages take place. Taking the usual age groups the following shows the number and proportions of free and prejudiced marriages in the ten years :—

Age Group.	Marriages with Ante-nuptial Conception.		Marriages without Ante-nuptial Conception.	
	Number.	Proportion per 1,000 of total Marriages at Age specified.	Number.	Proportion per 1,000 of total Marriages at Age specified.
Under 20.....	5,659	400	8,498	600
20 and under 25.....	11,478	295	27,469	705
25 „ „ 30.....	3,649	185	16,070	815
30 „ „ 35.....	897	139	5,541	861
35 „ „ 40.....	332	101	2,940	899
40 and over.....	79	28	2,779	972

It is convenient at this stage to refer to the question of illegitimacy, and, for the purpose of the discussion, illegitimate births are treated as first births. This is not always true, especially amongst older women, but the assumption does not affect, in any appreciable degree, the correctness of any deductions which may be made. Counting, then, illegitimates as first births, there were, in the ten years 1891–1900, 94,708 first births, viz :—

First births of post-nuptial conception.....	48,271
„ ante-nuptial conception.....	22,094
„ illegitimate parentage .....	24,343

This shows that in every thousand first-born children 510 are of post-nuptial conception, 233 of ante-nuptial conception, and 257 are illegitimate.

Distributing the 94,708 births according to the ages of the mothers some very interesting results are shown. The ages quoted are for the mothers at the time their children were born.

Age of Mother.	Illegitimate Births.		Legitimate Births.			
	Number of Cases.	Per 1,000 of first Births at each age.	Within 9 months of Marriage.		9 months and upwards after Marriage.	
			Number of Cases.	Per 1,000 of first Births.	Number of Cases.	Per 1,000 of first Births.
Under 20 .....	6,704	398	5,659	336	4,469	266
20 and under 25 .....	9,427	220	11,478	268	21,924	512
25   ,,   30 .....	4,308	189	3,649	160	14,858	651
30   ,,   35 .....	2,107	263	897	112	4,996	625
35   ,,   40 .....	1,361	409	332	100	1,635	491
40 and over .....	436	482	79	88	389	430
Total .....	24,343	257	22,094	233	48,271	510

When the mother's age is under 20 years the proportion of first births of post-nuptial conception is considerably less than either those of ante-nuptial conception or the illegitimate births. At ages 20-35 the births of post-nuptial conception are greater than those of the other classes combined, but at ages over 35 years they are somewhat less.

Considering the legitimates only, it will be seen that in the ten years there were 70,365 births, and of these 22,094 were of ante-nuptial conception and 48,271 of unprejudiced marriages. This gives a proportion of 314 births of ante-nuptial conception per thousand first births. These figures, however, must not be taken as a measure of the prevalence of the custom of ante-nuptial conception; elsewhere it is shown that the marriages after conception were 259 per thousand of all marriages. The two ratios are not inconsistent, for, whereas all prejudiced marriages are followed by the birth of a child, the marriages where conception has not already taken place are not necessarily fecund.

The legitimate births of first conception for the ten years 1891-1901, arranged according to the ages of mothers, were as follow :—

Age of Mother.	Post-nuptial Conception.		Ante-nuptial Conception.	
	Number of Cases.	Per 1,000 first Births at each age.	Number of Cases.	Per 1,000 first Births at each age.
Under 20 .....	4,469	441	5,659	559
20 and under 25 .....	21,924	656	11,478	344
25   ,,   30 .....	14,858	803	3,649	197
30   ,,   35 .....	4,996	848	897	152
35   ,,   40 .....	1,635	831	332	169
40 and over .....	389	831	79	169
Total .....	48,271	686	22,094	314



It will be seen that there is a marked decline in the rate of first births following ante-nuptial conception as the age of the mother advances ; this is not due, as might at first sight be supposed, to the superior wariness which comes to women with the increase of years—subsequent figures clearly disprove this—it is to be attributed rather to reluctance on the part of men to marry women of mature years, even when such women are likely to become mothers. Where parties are unmarried, and intercourse resulting in conception takes place between them, it may be presumed that, in the case of one or other, there is a desire that the illicit connection should end in marriage, but from the nature of the case, it might be conjectured that the proportion of marriages which follow illicit intercourse would be very irregular. The statistics, however, disclose a surprising regularity ; the proportion of marriages taking place after conception has been discovered being as follows :—

Year.	Cases of Illegitimate Birth.	Births within nine months of Marriage.	Total Births from Illicit Conception.	Marriages following Conception per 1,000.
1891	2,114	1,848	3,962	466
1892	2,289	1,905	4,194	454
1893	2,486	1,981	4,467	443
1894	2,424	2,048	4,472	458
1895	2,507	2,226	4,733	470
1896	2,432	2,287	4,719	485
1897	2,433	2,416	4,849	498
1898	2,497	2,408	4,905	491
1899	2,581	2,425	5,006	484
1900	2,580	2,550	5,130	497

The proportion of marriages following conception shows an increase, but this increase has been gradual, and is such as might reasonably be expected from the improved industrial conditions which the five years preceding the close of the century have witnessed.

Distributing the births of ante-nuptial conception into the periods elapsing from marriage to the occurrence of these births, some striking results are obtained. Before presenting the table it would be well to point out that some of the 3,330 children born in the seventh month may be of post-nuptial conception. It is evident, however, that the number of such seventh-month children must be very small. In the ten-year period, there were 3,228 children whose birth occurred at eight months after the marriage of their parents, and there are plausible reasons for supposing that the births of children of ante-nuptial conception should be more numerous at six months than at either seven or eight months after marriage ; but the same reasons that favour that conclusion would also favour the supposition that the seventh-month births should be more numerous than those of eight months. Assuming that the number of seventh-month children is a mean between those of six and eight months, the number of such would be 3,178 instead of 3,330 actually occurring, so that 152 is all that can be allowed for seventh-month children of post-nuptial conception out of 70,365 legitimate children first-born in the ten years, a figure which does not represent more than one such birth in every 463. There are, however, no proper data to support any definite conclusion on this interesting point.

The following is a statement of the number of marriages following conception during the ten years 1891–1900 :—

Period which marriage preceded Birth of Child.				Number of Marriages.
Under 1 month .....				1,015
1 month and under 2 months ...				1,148
2 months and under 3 months .....				1,998
3	„	4	„	2,534
4	„	5	„	2,733
5	„	6	„	2,980
6	„	7	„	3,228
7	„	8	„	3,330
8	„	9	„	3,128
Total .....				22,094

The prospect of a woman being married after conception, and before the birth of her child, is 476 in every thousand cases, a few more or less according to the conditions of employment. The longer a marriage is delayed after conception, the less likelihood is there of its being entered into, and a study of the figures makes its obvious that, in a very large number of instances, premarital intercourse is not an anticipation of marriage already arranged, but that the marriage is forced upon the parties, and would not have been entered into, were it not for the condition of the woman. The figures show a decline in the number of marriages month by month as the period of gestation draws to a close, but even to the last there is evidence of the almost despairing pressure brought to bear on the father before it becomes too late to save the legitimacy of the offspring.

Whether a woman will obtain marriage very much depends upon her age, as the following figures clearly show :—

Age of Women.	Legitimate Births within 9 months after marriage and Illegitimate Births.	Legitimate Births within 9 months after marriage.	Proportion of Births within 9 months after marriage to 1,000 Births of Illicit Conception.
Under 20 years .....	12,363	5,659	458
20 and under 25 .....	20,905	11,478	549
25 „ 30 .....	7,957	3,649	459
30 „ 35 .....	3,004	897	299
35 „ 40 .....	1,693	332	196
40 and over .....	515	79	153
Total .....	46,437	22,094	476

The probability of a young woman of 20 or 25 years obtaining marriage is 549 in every thousand cases—this is the maximum. After a woman has passed her 25th year the likelihood of her marriage grows rapidly less, and after 40 years the probability sinks to 153 in every thousand.



## Illegitimacy.

ACCORDING to the ordinary mode of reckoning, illegitimacy is on the increase in New South Wales. The proportions of illegitimate to total births during the years named were as follow :—

1881 .....	43·6 per thousand.
1886 .....	46·5     ,,
1891 .....	53·6     ,,
1896 .....	67·0     ,,
1901 .....	71·6     ,,

This method of comparing the number of children born out of wedlock with the total births is very apt to mislead ; first, because the illegitimate births, being comprised in the total births, are to some extent compared with themselves ; and second, and more important, the illegitimate births are compared with a standard, variable in itself, and which has been declining for many years. The only way to obtain a fair idea of the illegitimacy of a population, especially when the period under review covers a large number of years, is to compare the number of births with the number of persons from whom alone such illegitimacy can proceed ; that is to say, with the single women of child-bearing age. On this basis of comparison the rates do not show much variation. During the past forty years the illegitimate rate for single women, between the ages of 15 and 45 years, has varied between 15·29 per thousand in 1861 and 19·84 in 1893. As the information does not present any special characteristics, the rates for the decennial and quinquennial periods only are given.

Year.	Number of Single Women of ages 15 and under 45 years.	Illegitimate Births.	Rate per 1,000.
1861 .....	29,959	458	15·29
1866 .....	37,485	626	16·70
1871 .....	46,901	782	16·67
1876 .....	58,262	950	16·31
1881 .....	72,375	1,263	17·45
1886 .....	91,943	1,687	18·35
1891 .....	117,964	2,136	18·11
1896 .....	140,823	2,422	17·20
1901 .....	166,338	2,699	16·23

These figures make it quite clear that illegitimacy is not increasing in New South Wales, and completely remove the false idea obtained by comparing the legitimate with the illegitimate natality.

The very interesting question as to whether the causes which have affected legitimate natality have also affected the birth of illegitimate children cannot be solved by any statistics that are available, but it can hardly be supposed that single women have learned less than their married sisters. The births, therefore, compared with the number of unmarried women of nubile ages may not give a complete answer to the question whether concubinage has increased within recent years.

The birth-rates amongst unmarried women, arranged according to age groups from 15 to 45 years, were, for the ten years which closed with 1900, as shown in the following table ; the rates for married women have been inserted to complete the comparison :—

Age Groups of Mothers.	Birth-rate per 1,000.	
	Unmarried Women.	Married Women.
15 and under 20 years .....	11·29	360·21
20     "      25     "      .....	24·94	382·67
25     "      30     "      .....	22·73	317·49
30     "      35     "      .....	24·11	252·35
35     "      40     "      .....	25·03	208·83
40     "      45     "      .....	4·88	96·25
15 and under 45 years .....	17·58	253·69

It will be observed that amongst unmarried women there is no great variation in the rates for the twenty years between age 20 and age 40 years, while for married women the rates fall nearly one-half. The progression of the rates, however, would correspond much more nearly were it not for the marriage of women already pregnant, the proportion of such marriages being much larger amongst women of the younger ages ; adding the births of ante-nuptial conceptions, the following results are obtained for each of the foregoing age groups :—

Age Groups of Mothers.	Births of Ante-nuptial Conceptions and Illegitimate Births per 1,000 Unmarried Women.
20 and under 25 years .....	53·52
25     "      30     "      .....	40·97
30     "      35     "      .....	33·87
35     "      40     "      .....	30·82
40     "      45     "      .....	5·82

These results are in much closer agreement with the progression of rates for married women than those in the previous table, and if it be taken as proved that the fecundity of the married, and the probable and actual fecundity of the unmarried are about the same, then it must be concluded that the birth-rate amongst unmarried women is subjected to the same restrictions as amongst the married.



## Fecundity.

THE term fecundity is used throughout these pages to mean the power of reproduction or proved ability to bear children, the existence of which is shown by the birth of a child. This is the sense in which the word is used in Dr. Matthews Duncan's work on "Fecundity, Fertility, and Sterility." According to this definition, fertility can be predicated only of women who are fecund, and a woman is said to be more or less fertile according to the number of her children.

The probability of a marriage being fecund depends upon the age of a woman at the time of her marriage, and decreases from the lower to the higher ages, slowly at first, but very rapidly as the limit of the child-bearing period is approached.

In dealing with the question of fecundity there is an initial difficulty arising out of the circumstance that, so far as concerns a large number of women, the day of their marriage is not the point from which fecundity should be reckoned, for in every thousand instances of first births 314 are due to ante-nuptial conceptions. An actual example will show the difficulties of the case. In New South Wales, during the five years, 1896-1900, 2,697 marriages were contracted by women 25 years of age, and to these have been or will be born 2,454 first children. But, as 672 of these women were already with child at the time of their marriage, the question arises, were not these women only a portion of those who were liable to conception before marriage. Undoubtedly such was the case, and it is a probable assumption that the proportion of women who were with child before marriage as compared with the whole number of single women who were liable so to become, was somewhat the same as the proportion of other women of the same age but of non-prejudiced marriage who became mothers, compared with the total of unprejudiced marriages.

In the instance given, there were 2,025 non-prejudiced marriages, to which were born 1,782 children, and 672 prejudiced marriages (*i.e.*, marriages with ante-nuptial conception) with an equal number of births. In the first case, the proportion of fecund marriages is 88 per cent., and in the second, 100 per cent.; this latter ratio is, of course, most unlikely, and the probabilities are that, besides the 672 cases in which marriage took place, there were others in which, in the absence of conception, marriage did not follow, and therefore, to obtain a true idea of fecundity, all marriages attended by ante-nuptial conception should be excluded. This course has been adopted in the following table, which gives the number of marriages that will prove fecund in every thousand entered into. The information is based on the experience of the seven years from 1891 to 1897, full allowance being made for unproved conceptive power at the close of 1901, to which year the experience extends.

## PERIOD 1891-1897.

Age of Woman at Marriage.	Fecund Marriages, per 1,000.	Age of Woman at Marriage.	Fecund Marriages, per 1,000.
Years.		Years.	
20	912	36	597
21	909	37	513
22	906	38	427
23	903	39	357
24	897	40	307
25	889	41	260
26	880	42	215
27	869	43	171
28	855	44	131
29	841	45	92
30	825	46	61
31	795	47	41
32	764	48	22
33	732	49	9
34	696	50	0
35	653		

The proportion of marriages proving fecund diminishes as the age at marriage increases ; the diminution after age 30 is attained being very rapid, so that at 37 years the probabilities of fecundity or of childlessness are about the same ; at age 41 the respective probabilities are as 260 to 740 ; at age 45 only 92 out of a thousand marriages are fecund, while at age 50 there is no probability of a child being born.

The great fall in the birth-rate of Australia during the last two decades has been elsewhere alluded to, and one of the factors partly accounting for it, viz., the increase in the age of women at marriage has been discussed. A second factor in the decline is the increase in absolute sterility, that is to say, the falling off in the proportion of fecund marriages, and though an exact measure of this increased sterility cannot be given, there is ample evidence to show that it has been considerable. The difficulty in determining the actual increase of sterility arises from the fact that information in regard to ante-nuptial conception does not extend further back than 1891, and any corrections applied to earlier figures would be on the assumption that the experience of 1891-1900 held good for the previous thirty years, an assumption which it would be somewhat unsafe to make. Leaving out of consideration, therefore, the question of ante-nuptial conceptions the apparent fecundity at different periods was as shown below. The figures indicate the number of marriages proving fecund in every thousand entered into, and depend partly upon information obtained at the Census of 1901 and partly on the records pertaining to the deaths of married women during the past twenty years.

Age of Woman at Marriage.	Period of Marriage.			
	1861-1870.	1871-1880.	1881-1890.	1891-1897.
15	987	987	980	978
20	970	972	966	948
25	963	948	941	919
30	923	897	873	852
35	845	801	739	706
40	719	576	504	410
45	234	275	125	92



Taking the figures as they stand, it will be seen that there has been a considerable decline in the fecundity of women marrying during recent years, as compared with those marrying twenty years ago. This decline is visible in every age group, but especially after age 30. The decline between 1861-70 and 1891-97 at each age group stated as a percentage was :—

Age of Women at Marriage.	Decline in Fecundity.
Years.	Per cent.
15.....	0·9
20.....	2·3
25.....	4·6
30.....	7·7
35.....	16·5
40.....	43·0
45.....	60·1

Taking the average age at marriage (25 years) the proportion of marriages contracted from 1861 to 1870 which proved fecund was 963 in every thousand, leaving 37 childless, whereas, for present day marriages, allowing for unproved fecundity at the close of 1901, the proportion is 919 fecund, and childless 81. A reduction in fecundity from 963 to 919 per thousand marriages represents a fall of 4·6 per cent. ; it is probable the actual fall, that is, allowing for ante-nuptial conceptions, was higher, viz. :—from 951 to 889 per thousand marriages or 6·6 per cent., but, as the birthrate for the same period fell from 41·74 per thousand to 27·76, the decline in the proportion of fecund marriages does not go very far to account for the diminished birth-rate.

Looking at the question as from the point of view of the increase of childless marriages the figures are very striking, even without allowance for ante-nuptial conceptions. The following comparison shows the proportion of childless marriages contracted at various ages, arranged in decennial periods from 1861 to 1897 :—

Age of Mother at Marriage.	Period of Marriage.			
	1861-1870.	1871-1880.	1881-1890.	1891-1897.
15	13	13	20	22
20	30	28	34	52
25	37	52	59	81
30	77	103	127	148
35	155	199	261	294
40	281	424	496	590
45	766	725	875	908

## Geographical Distribution of Fecundity.

THE proportion of childless marriages differs considerably in different parts of the state. This will be seen from the following statement, based on information obtained at the Census of 1901. The figures give the present age of married women, and for every 1,000 of such women, the number who were without children. It will, of course, be understood that many women, especially at the younger ages, have been married recently and may still become mothers, and the figures have only a comparative, not an absolute value.

Division.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.
City and Suburbs of Sydney .....	318	209	146	120	115
Balance of Metropolitan County (Cumberland) .....	256	142	80	79	69
Coastal Districts .....	236	125	73	58	60
Table-land ..	229	124	74	58	58
Western Slope .....	234	117	79	70	64
Riverina and Plains east of Darling .....	253	112	105	76	75
Counties Robinson and Yancowinna .....	281	184	152	98	.....
Plains west of Darling.....	227	137	99	.....	.....

The foregoing figures are not altogether conclusive, as the age attained is not necessarily an index of the duration of marriage, and both age and duration are factors in determining fecundity. It is not, however, likely that the duration of marriage for women of like age differs greatly in the different districts.

It will be seen that in the city and suburbs of Sydney, women at all ages show the largest proportion of childless marriages, while fecundity is highest in the three divisions comprising the Coast Districts, the Table-land, and Western Slope. Of the other divisions, counties Robinson and Yancowinna, in which copper and silver mining are carried on extensively, and in which are situated the towns of Cobar and Broken Hill, more nearly approach the city and suburbs of Sydney, while the plains near the Darling show an average rate between the general rural and urban rate. These last-mentioned divisions are, no doubt, affected by the fact, as made evident by the 1901 Census, that a large proportion of husbands are away from home during a considerable part of the year. The chief business of the country is sheep-farming, and the stations are wide in extent, and these absences are necessitated by the manner in which the industry is carried on.

It is obvious that the differences shown in the foregoing statement are not all, or in any large degree, due to climatic influences. The district of Sydney



has a climate similar in all essential respects to that of the rest of the coastal district. The Table-land, on the contrary, differs greatly as regards climate from the coast, yet has about the same average fecundity. The explanation of the difference must, therefore, be sought for, either in the influence of town life or in the occupations of the people. As to the influence of town life, this, so far as concerns New South Wales, may be summed up in the question of artificial checks, the aids to which are more accessible in the cities than in the country. As regards the influence of occupation, very little of value can be determined, for though the comparative fecundity of the wives of men following different callings can be ascertained with some degree of accuracy, differences between husbands by no means indicate differences of like degree between their wives, and, moreover, in Australia, the present occupation of a man is not necessarily an indication of the occupation followed by him at his marriage, and when his children were begotten. The subject is one of great complexity, and it is disappointing that the present inquiry is able to contribute so little to its solution.

## Fecundity in relation to Birthplace and Religious Belief.

It has been pointed out that the future birth-rate of the state will depend more and more largely, as time goes on, upon the child-bearing of women of Australian birth, as the influx of women of European origin has ceased to be an important factor in the increase of the population. In 1891, the married women of New South Wales who were born in Australia and New Zealand numbered 96,528, in a total of 165,571; in 1901 their number was 146,039, in a total of 206,186; the proportion of such women increased, therefore, during the ten years from 58 to 71 per cent.

The following is the ascertained number of childless marriages in every 1,000 contracted at the ages mentioned, but, owing to the occurrence of many births of ante-nuptial conception and the impossibility of adjusting the rates for women of different birthplaces to allow therefor, the figures must be taken as showing the apparent rates, the true rates for marriages not prejudiced by ante-nuptial conception being somewhat higher. In order that the comparisons should be equal for all women, those only have been included whose marriage has subsisted for a period of at least five years:—

Birth-place.	Age at Marriage.				
	18	20	25	30	35
New South Wales .....	21	32	58	114	255
Other States of Australia and New Zealand	34	56	85	176	345
England and Wales .....	42	60	106	212	362
Scotland .....	33	39	74	127	359
Ireland .....	35	45	74	157	403
Other countries.....	40	63	119	253	352

The fecundity of Australian women is greater than that of European women living in Australia at every age of marriage, and amongst other women the Scotch show greater fecundity than the Irish, and the Irish than English women. Women of these nationalities and Australian women form the great bulk of the married population, women of non-British birth comprising only  $2\frac{1}{2}$  per cent. Taking women of all ages living in New South Wales, who, in 1901, had been married more than five years, and had not attained the age of 45 years when they married, the following statement shows their number and the proportion of childless women per 1,000. There is a slight difference in the average age at marriage of women of different nationalities, the average for New South Wales women being, for example, about 2 years and 4 months below that of British women; but a full



allowance on this score will not alter the position of the women of New South Wales, as superior fecundity is shown by them at every age :—

Birth-place.	Total Wives.	Wives without Children.	Childless Wives per 1,000.
New South Wales .....	89,398	4,322	48
Other Australian States and New Zealand .....	18,082	1,376	76
England and Wales .....	26,780	2,829	106
Scotland .....	6,291	505	80
Ireland .....	14,145	1,314	93
Other countries .....	3,922	426	109
All countries .....	158,618	10,772	68

The superior fecundity of Australian women is found to prevail both in the urban and in the rural districts, and is certainly difficult of explanation. It has been variously attributed to racial peculiarities, social habits, and climatic conditions. As regards the first of these, the Australian people are of English, Irish, and Scotch descent almost exclusively, the proportion of other races represented amongst them being very slight. There has, however, been no complete amalgamation of the various British stocks; on the contrary, there has been a tendency for the Irish and their descendants of the first generation, and of the Scotch and their descendants, to marry amongst their own people. This tendency is not now so marked as formerly, and it seems probable that a few generations hence there will be few Australians who will not be able to count amongst their immediate ancestors persons of English, Irish, and Scotch descent. That the process of amalgamation has not gone farther is to be attributed to the fact that few persons have an Australian ancestry extending beyond three generations; indeed, the great majority of Australian born adults are Australians of the first generation only. Racially, therefore, the Australian people do not differ from their fellow colonists of British birth. Nor is the superior fecundity of the Australian born women attributable to a difference in their material condition. Australians are represented in all walks of life somewhat proportionately to their numbers in the total population, and their command over material comforts is the same as that of the rest of the community. The suggestion that the superior fecundity of Australian women is due to the influence of climate is probably, in the main correct, but the statistics available throw no light on this interesting question. There is, in Australia, a consensus of opinion that Australian girls usually arrive at the pubertal state at an earlier age than girls born in the British Isles, and earlier pubescence may lead to greater comparative fecundity, though not to greater fertility. But too much importance may perhaps be attached to the figures in the preceding tables. It is true that Scotch women appear to have amongst them 80 per 1,000 childless women, the Irish 93, and the English 106, as compared with 48 amongst New South Wales women, and these numbers show 66 per cent. more sterility for Scotch, 94 for Irish, and 104 for English women; but this is an exaggerated way of looking at the matter, for, as regards ratio of fecundity, the women of English birth may be said to be 6 per cent. less fecund than Australian women, the women of Irish birth 4·7 per cent., and the Scotch 3·4 per cent.

In connection with the question of birthplaces, a peculiar condition of fecundity is observable. Women in every age-group are more fecund with husbands of their own nationality than with husbands of different origin.



This peculiarity is strongly marked in the following series, which shows the proportion of childless marriages per 1,000 amongst women who have taken husbands of other nationalities compared with the proportion amongst women who have married men of their own nationalities. Unlike the previous table, the figures now given include not only women who have been married for at least five years, but all women, as it has not been found possible to present the information in any other form.

	Childless Marriages.	
	Husbands of same country.	Husbands of other country.
New South Wales .....	113	132
Other Australian States .....	150	166
England and Wales .....	147	173
Scotland .....	96	156
Ireland .....	109	157

That artificial means are resorted to in order to prevent conception must be obvious to all, and that the use of these checks is increasing may be taken as proved by the figures herein given. The moral aspect of prevention is not here under discussion ; but as the habit is discountenanced by the authorised teachers of most forms of religion, it would be interesting to inquire if the statistics give evidence that the views of the teachers are supported by the practice of the adherents. The figures relating to fecundity, however, throw very little light on the problem. A high fecundity rate is not in itself a proof of the absence of preventive checks to conception. The test of fecundity which these tables exhibit is the birth of one child to a woman during her marriage ; and as this investigation proceeds it will be seen that some women may be less fecund than others, and at the same time more fertile. This, for instance, is the case with women of Irish birth. They are less fecund than women born either in New South Wales or in Scotland, but more fertile—that is to say, fewer Irish women have children, but to those who are fecund more children are born. The question of religious opinion as affecting child-bearing cannot, therefore, be discussed until the question of fertility is dealt with. It will be convenient, therefore, to defer its consideration until a later chapter.

The following statement deals with the principal religions represented at the Census of 1901 ; and in order that the comparison might be absolutely on a level for all, it has been restricted, as in the table relating to birth-places, to women who were married before they had reached their 45th year, and who at the date of the Census had been married for five years and upwards, and whose fecundity may, therefore, be taken as having been fully tested. The figures show the number of unfruitful marriages out of every thousand contracted.

Religion.	Age at Marriage.				
	18	20	25	30	35
Church of England ... ..	28	44	80	169	321
Roman Catholic .....	27	41	65	145	341
Methodist .....	18	30	57	102	281
Presbyterian .....	30	36	68	130	313
Hebrew .....	65	62	113	224	438
Others .....	34	47	85	168	329

Taking women of all ages who were married within the child-bearing period, and whose marriage has subsisted for five years or more, the following figures give the proportion of childless marriages in the state of New South Wales as ascertained at the Census of 1901.

Religion.	Total Wives.	Wives without Children	Fecund Wives per 1,000.	Childless Wives per 1,000.
Church of England .....	74,080	5,245	929	71
Roman Catholic .....	39,297	2,620	933	67
Methodist .....	17,371	858	951	49
Presbyterian .....	15,745	1,064	932	68
Hebrew .....	794	73	908	92
Other Religions.....	11,331	912	920	80
All Religions ... .	158,618	10,772	932	68

Taking the figures as they stand it would appear that Methodist women display more fecundity than women of any other faith; next in order come Roman Catholics, Presbyterians, and women belonging to the Church of England. Jewish women stand lowest on the list. The difference in fecundity between the highest and the lowest class is only 4·3 per cent., a proportion which would make little difference in the actual birth-rate.

The superior fecundity of marriages entered into by persons of the same nationality as compared with marriages of persons of different origin has been referred to; a like phenomenon is observable in connection with religions. This is clearly brought out in the following table. In some measure, the two phenomena may be due to the working of the same causes, for Anglicanism is the religion of the majority of the natives of England, just as Presbyterianism is that of the majority of Scotsmen, and Roman Catholicism is the national religion of the Irish. This, however, does not go far to explain this peculiar condition of fecundity. One important denomination, the Methodist, displays the same characteristics as the other religions, and Methodism is not in any marked degree professed by persons of one nationality. The following were the childless marriages in every thousand; it has not been possible to restrict the table to marriages that have existed for five years and upwards, therefore, as in the similar table relating to birth-places, all married women have been included.

	Husbands of same Religion.	Husbands of other Religion.
Church of England .....	129	181
Roman Catholic .....	118	163
Methodist .....	106	180
Presbyterian .....	115	173
Hebrew .....	134	306

The difference in the extent of childless marriages, comparing women married to husbands of their own faith with women married to other husbands, is very marked, especially for Jewish women. It is curious to note that difference of religion in husband and wife appears to affect fecundity to a much greater degree than does difference of nationality, and when the question of fertility comes to be discussed it will be seen that the same peculiarity is observable.



## Birth-rate according to Age of Mother and of Father.

IN the ten years, 1891 to 1900, inclusive, there occurred in New South Wales 356,511 legitimate and 24,608 illegitimate births.

The youngest mother was 12 years old and unmarried, but, in the course of the ten years there was happily only one such mother. At age 13 there were twelve mothers, and at age 14 eighty-four. At the other extreme, there was one mother at age 58, one at 56, three at 55, of whom one was unmarried, two at 54 (one unmarried), five at 53, and one at 51 years.

For every 10,000 married mothers the age distribution was found to be as shown in the following table :—

Mother's Age.	Proportion of Mothers at each age per 10,000 legitimate births.	Total Children in 10,000 born at or before each age.	Mother's Age.	Proportion of Mothers at each age per 10,000 legitimate births.	Total Children in 10,000 born at or before each age.
15	2	2	33	443	7,297
16	13	15	34	421	7,718
17	46	61	35	397	8,115
18	107	168	36	362	8,477
19	191	359	37	325	8,802
20	258	617	38	284	9,086
21	371	988	39	241	9,327
22	454	1,442	40	200	9,527
23	524	1,966	41	160	9,687
24	555	2,521	42	118	9,805
25	563	3,084	43	81	9,886
26	588	3,672	44	51	9,937
27	577	4,249	45	33	9,970
28	593	4,842	46	18	9,988
29	540	5,382	47	9	9,997
30	515	5,897	48	2	9,999
31	491	6,388	49	1	10,000
32	466	6,854			

At age 50 there were, during the ten years 1891–1900, only eight births amongst 31,555 married women of that age. This gives a rate of only one birth to 3,944 women.

From the foregoing it would appear that one-fourth of all children have mothers whose ages are below 24 years, one-half have mothers below 28 years and 4 months, and three fourths below 33 years and 6 months. The following is a statement of the exact age attained by mothers when the indicated proportions of children are born. The figures in this, and in the preceding table, refer to married mothers only.

Percentage of Children.	Age of Mothers.	Percentage of Children.	Age of Mothers.
	Years. Months.		Years. Months.
5 .....	19 7	60... ..	30 3
10 .....	21 0	70.....	32 4
20 .....	23 1	75... ..	33 6
25 .....	24 0	80.....	34 9
30 .....	24 10	90.....	37 8
40 .....	26 7	95.....	39 10
50 .....	28 3		



It will have been seen that the years of proved possible fertility in New South Wales extend from the 12th to the 58th year, both inclusive, or over a period of 47 years, but as not more than seven and a half per cent. of all children are born to mothers who are not between the ages of 19 and 41 years, the period of child-bearing could, for all practical purposes, be taken as the twenty-two years included within these limits. It is customary, however, to count the reproductive period as extending to the forty-fifth year, and in the various tables yet to be given, the term child-bearing period for married women, will be taken as including all women under 45 years of age.

It will have been observed that the proportion of births increases with each year of the mother's life up to about 28 years, which is the age when most children are born. Age 28 is not, however, the period of greatest fertility, for, as will be seen later on, a woman reaches the summit of her fertility seven years earlier.

The important effect which ante-nuptial conceptions have on the birth-rate has been dwelt upon at some length in a previous chapter, and in determining the probability of a woman of a given age giving birth to a child, due allowance must be made on this score. In the following statement is shown the probability of a married woman at each specified age giving birth to a child. Two probabilities are given, viz., (a) for all women, and (b) for women not already pregnant when they were married. It will be seen that the effect of ante-nuptial conceptions is greatly to exaggerate the apparent fertility at the earlier ages.

Age.	Probable Births within a year to 1,000 married women.		Age.	Probable Births within a year to 1,000 married women.	
	Actual rate excluding ante-nuptial conception. (b)	Apparent rate including ante-nuptial conception. (a)		Actual rate excluding ante-nuptial conception. (b)	Apparent rate including ante-nuptial conception. (a)
19	279	390	35	194	196
20	287	371	36	183	184
21	293	354	37	172	173
22	293	338	38	159	160
23	291	323	39	146	147
24	288	309	40	131	132
25	281	296	41	115	115
26	275	285	42	96	96
27	267	273	43	75	75
28	259	263	44	55	55
29	250	253	45	38	38
30	242	245	46	23	23
31	233	235	47	13	13
32	223	225	48	6	6
33	214	216	49	3	3
34	204	206			



The foregoing shows a very low fertility rate compared with what has ruled in previous years. The extent of the decline may be gauged from the following table, showing births per thousand women of the stated ages :—

Age of Mother.	Period of Marriage.		
	1850 to 1870.	1871 to 1880.	1891 to 1900.
20 and under 25 years .....	420	358	293
25    "    30    "    .....	414	352	267
30    "    35    "    .....	391	337	223
35    "    40    "    .....	296	292	172
40    "    45    "    .....	163	150	96
45    "    50    "    .....	60	54	13
50    "    55    "    .....	10	10	1

The decline from the first to the second period is susceptible of explanation entirely apart from any suggestion of the use of artificial checks. The period 1850 to 1870 was one during which Australia received an accession of female population of an exceptionally vigorous type, and it is probable that the birth rate, especially for the younger classes of women, was on this account exceptionally high. During the second period the birth rate per thousand of the population ranged between 38 to 40, which compares very favourably with that of other countries with population similarly constituted. To compare the fertility rates of present day marriages with the rates ascertained for 1850–1870 would give an exaggerated impression of the decline that has since taken place. There are many reasons for supposing that the fertility rates for 1871–80 represent, if not a condition of life in marriage uninfluenced by considerations of restriction, yet one in which the results of restriction were not greatly manifest, and, therefore, this is one with which subsequent periods may be compared without fear of exaggeration. In the foregoing table the ten years from 1881 to 1890 are left out of consideration. This has been done, not because there is lack of information available; but because the rapid decline in the rates, especially towards the end of the period, makes any comparison for the whole ten years quite valueless.

Comparing the fertility rates of 1871–1880 with those of the last decade, it will be seen that there has been a decline at every age group, and an examination of the details shows that at age 37 the fertility of the earlier period is equal to the summit of fertility in the latter, that is to say, at age 22, and taking all ages of marriage the reduction in fertility is equivalent to about 25 per cent. From whatever point the matter be viewed, it must be confessed that so great a falling off in the fertility of the married women of a new country, as indicated by the figures just given, is an economic and social problem of very great import, the seriousness of which will perhaps be more clearly realised when the actual number of children born to married couples comes to be discussed in a later chapter.

The reputed ages of the fathers of children born in the ten years under consideration, varied between 16 and 85 years. It will be seen, when the effect of the parents' age on child-bearing is further dealt with, that the number of offspring to a marriage depends, in the great majority of instances, upon the age of the female. Concerning the effective duration of male fertility, nothing of a determinative character can be proved from the statistics; the duration is, and must remain, largely a matter of speculation, until decided on other evidence than the mere statements of the parents, which in this instance form the basis of the statistics. It should, therefore, hardly

need to be pointed out, that the occurrence of the birth of a child to fathers of such an advanced age as 85 years, as shown in the New South Wales statistics, must be held to be extremely doubtful.

Although the question of the husband's age is not of great importance, it will arise later on in connection with bigenous natality, and it is desirable that the probability of a birth to the wives of men of different ages should be given. The following statement affords this information.

Age of Husbands.	Probable Annual Births to 1,000 wives of husbands of age stated.	Age of Husbands.	Probable Annual Births to 1,000 wives of husbands of age stated.	Age of Husbands.	Probable Annual Births to 1,000 wives of husbands of age stated.
20	297	37	210	54	59
21	299	38	199	55	56
22	299	39	187	56	53
23	298	40	175	57	51
24	296	41	162	58	48
25	293	42	148	59	46
26	289	43	135	60	44
27	284	44	123	61	42
28	279	45	112	62	40
29	273	46	102	63	38
30	267	47	93	64	36
31	261	48	86	65	34
32	255	49	80	66	33
33	247	50	75	67	31
34	239	51	70	68	29
35	231	52	66	69	28
36	221	53	63	70	27



# First Births.

THE discussion of the phenomena attending first births is greatly affected by the circumstances that nearly one third (31 per cent.) of all such births are due to ante-nuptial conception. During the ten years 1891–1900, there were 70,365 first-born children, and the birth of 22,094 of these occurred within nine months of the marriage of their parents, and were therefore of ante-nuptial conception, with the exception of a few occurring at seven months. The probable number of seventh-month children has already been discussed, and it will be seen that their exclusion from the post-nuptially conceived will not affect, in any appreciable degree, the conclusions herein arrived at.

The probability of a marriage proving fecund has been shown to decline rapidly as the age at marriage increases ; the following table shows that the period elapsing from marriage to the birth of a first child also increases with the age of the mother at marriage. The following are the average periods elapsing from marriage to the birth of a child for mothers of each age ; the figures are the actual averages without adjustment.

Age of Mother.	Marriage to Birth of First Child.	Age of Mother.	Marriage to Birth of First Child.	Age of Mother.	Marriage to Birth of First Child.	Age of Mother.	Marriage to Birth of First Child.
	months.		months.		months.		months.
17	14·2	23	16·9	29	22·9	35	31·3
18	14·7	24	17·4	30	25·7	36	35·2
19	15·0	25	18·2	31	25·6	37	31·5
20	15·7	26	18·7	32	30·4	38	34·5
21	15·4	27	20·4	33	29·2	39	34·6
22	15·8	28	21·7	34	29·1		

For women 20 years of age and under 25 the average period from marriage to the birth of the first child is 16·3 months ; for women 25 and under 30 years, 19·9 months ; 30 and under 35 years, 27·5 months ; and 35 and under 40 years, 33·2 months ; for all women, the interval is 19·6 months. Although the average varies only about twenty months, as between the first and last years (17 and 39), shown in the preceding table, the time amongst individuals varies by more than as many years, for the New South Wales records show that a first birth has taken place at so remote a period from marriage as 22 years.

The time elapsing from marriage to the birth of the 48,271 children of post-nuptial conception, occurring in the ten years, has been ascertained, and is indicated in the following statement ; for convenience sake the numbers have been reduced to the proportions due to 10,000 marriages. It has been necessary to make some slight adjustments to allow for the fact that the births are not, in all cases, due to the marriages of the period. The process of adjustment is rather tedious and without special features of interest, and involved the addition of only 207 probable births to the 48,271 actually recorded ; it has, therefore, not been considered worth while to insert it here.

It would be well to observe that the period denoted as 9 months represents 9 months and under 10 months ; 35 months represents 35 months and under 36 ; 3 years represents 3 years and under 4 years, and similarly for the other periods.

Period after Marriage.	Number of Births.	First Births to end of each period.		Period after Marriage.	Number of Births.	First Births to end of each period.	
		Number.	Per cent. of Total Births.			Number.	Per cent. of Total Births.
Months.				Months.			
9	1,249	1,249	16·59	32	43	6,789	90·18
10	1,158	2,407	31·97	33	39	6,828	90·70
11	818	3,225	42·84	34	36	6,864	91·18
12	592	3,817	50·70	35	34	6,898	91·63
13	453	4,270	56·72	Years.			
14	351	4,621	61·38	3	251	7,149	94·97
15	306	4,927	65·45	4	132	7,281	96·72
16	252	5,179	68·80	5	68	7,349	97·62
17	205	5,384	71·52	6	48	7,397	98·26
18	180	5,564	73·91	7	32	7,429	98·68
19	154	5,718	75·96	8	28	7,457	99·06
20	145	5,863	77·88	9	21	7,478	99·34
21	127	5,990	79·57	10	13	7,491	99·51
22	114	6,104	81·08	11	10	7,501	99·64
23	107	6,211	82·51	12	9	7,510	99·76
24	91	6,302	83·71	13	3	7,513	99·80
25	83	6,385	84·82	14	4	7,717	99·85
26	75	6,460	85·81	15	4	7,521	99·91
27	68	6,528	86·72	16	3	7,524	99·95
28	62	6,590	87·54	17	2	7,526	99·97
29	57	6,647	88·30	18	1	7,527	99·99
30	52	6,699	88·99	20	.....	7,527	99·99
31	47	6,746	89·61	22	1	7,528	100·00

It would appear from the foregoing figures that 7,528 out of 10,000 marriages will prove fecund ; of the remaining 2,472, some are marriages that will be cut off by death, some the marriages of those who have married too late to bear children ; but the greater number are marriages which would be childless in any circumstances. If a woman is fecund, in 500 cases in 1,000 she will give birth to a child within thirteen months of marriage, in 750 cases within eighteen months and a half, and in 900 cases within about thirty-two months. When a woman has been married five years, and has not given birth to a child, the probabilities are nearly fifteen to one that she will not conceive ; when a marriage has subsisted childless ten years, the probabilities are sixty-eight to one against conception.

The decline in the fecundity of present day marriages compared with those at former periods has already been discussed from the standpoint of the woman's age at marriage. Taking all women under 45 years of age, the following is a statement of the probable number of such women who, not having been mothers, will give birth to a child within twelve months. The table commences with the year 1891, and closes with 1900, and therefore embraces a full intercensal period. The figures have been arranged in two columns, the first includes births due to ante-nuptial conception, and the second is exclusive of such. A comparison of the two sets of figures will afford information as to the effect which ante-nuptial conceptions have in sustaining the marriage and the birth rates.



## BIRTHS to 1,000 women under 45 years, without previous issue :—

Year.	Including Ante-nuptially conceived Births.	Excluding Ante-nuptially conceived Births.	Year.	Including Ante-nuptially conceived Births.	Excluding Ante-nuptially conceived Births.
1891	504	427	1896	430	332
1892	500	423	1897	412	312
1893	505	423	1898	406	312
1894	476	386	1899	394	302
1895	461	362	1900	383	291

The reduction in the birth of first children during the short space of ten years, which this table shows, is from 427 to 291 per thousand, equal to 31·85 per cent.

Births to Women with Previous Issue.

It is, perhaps, natural that women who have been mothers should be desirous of postponing a recurrence of the cares incidental to child-bearing for as long a time as possible, and, therefore, the interval between a woman's confinements might reasonably be expected to grow longer as the number of her children increases. Actual experience shows differently, and it would appear that the period elapsing between confinements does not lengthen as the number of children increases. This condition probably arises from the circumstance that the less fertile women, who form the majority of those with one to four children, have comparatively long intervals between their confinements, and thus increase the average of all women. When this class ceases to bear, the remaining women, whose earlier children were born at short intervals, continue to bear with much the same rapidity, and the average interval between the births of later children appears less than for those born in the earlier married years.

The following is a statement of the average time elapsing between each successive birth :—

				Months,
Marriage to birth of 1st child	.....			19·2
1st child to birth of 2nd	„	.....		28·8
2nd	„	3rd	„	26·4
3rd	„	4th	„	24·0
4th	„	5th	„	20·4
5th	„	6th	„	24·0
6th	„	7th	„	23·4
7th	„	8th	„	20·4
8th	„	9th	„	20·4
9th	„	10th	„	20·4

The table just given deals with women of all ages. A still more interesting presentation of the facts relating to the time elapsing from marriage to the births of successive children is obtained by showing the ages at marriage in conjunction with the issue. The average age of mothers at the birth of each child, from women marrying at ages 20, 25, 30, and 35 years, is set out in the following statement :—

Mother's Age.				
Age at Marriage.	20·000	25·000	30·000	35·000
„ „ 1st Child.	21·635	26·689	31·688	36·724
„ „ 2nd „	23·676	28·721	33·651	38·708
„ „ 3rd „	25·782	30·828	35·731	40·570
„ „ 4th „	27·931	32·835	37·772	42·303
„ „ 5th „	29·607	34·503	39·212	.....
„ „ 6th „	31·761	36·515	41·061	.....
„ „ 7th „	33·876	38·469	42·811	.....
„ „ 8th „	35·943	40·359	44·443	.....
„ „ 9th „	37·956	42·176	.....	.....
„ „ 10th „	39·896	43·905	.....	.....
„ „ 11th „	41·748	45·535	.....	.....
„ „ 12th „	43·508	47·030	.....	.....
„ „ 13th „	45·175	.....	.....	.....
„ „ 14th „	46·768	.....	.....	.....
„ „ 15th „	48·298	.....	.....	.....



These figures are based on the experience of all women living in the state at the date of the Census, and do not, therefore, give the expectation of women who have married recently or of future marriages. They afford additional evidence, if such were needed, of the incorrectness of the popular assumption that the fertility of women marrying at immature ages soon becomes exhausted. The figures, however, seem to show that when women marry at mature years and prove fecund, their children come a little more quickly than those of younger women. The evidence on the point is, however, somewhat conflicting, and this view cannot be strongly pressed.

The birth of each succeeding child brings a woman nearer and nearer to the limit of her child-bearing, and there is a far larger proportion of older women amongst those with large than amongst those with small families. This will be seen from the following statement, in which the average age of mothers at the birth of each child is given.

		Average Age of Mother.
1st child	....	25·6 years
2nd	„	28·0 „
3rd	„	30·2 „
4th	„	32·2 „
5th	„	33·9 „
6th	„	35·9 „
7th	„	37·9 „
8th	„	39·6 „
9th	„	41·3 „
10th	„	44·3 „

The increase in the age of the mothers ought to be accompanied by a decline in fertility, and such appears to be the case. Much more than this is disclosed by the following table, which gives the number of children born within a year to 1,000 women under 45 years of age with the specified number of previous issue. The figures cover a full intercensal period.

NUMBER of Children born in 12 months to 1,000 women according to previous issue.

	With 1 child.	With 2 child- ren.	With 3 child- ren.	With 4 child- ren.	With 5 child- ren.	With 6 child- ren.	With 7 child- ren.	With 8 child- ren.	With 9 child- ren.	With 10 child- ren.	With 11 and more children.
1891...	345	269	268	256	260	231	228	232	227	193	174
1892...	326	264	269	258	252	244	238	228	224	200	162
1893...	318	263	265	254	246	234	219	225	221	188	166
1894...	304	248	245	236	232	227	227	219	212	191	156
1895...	298	248	235	232	234	218	220	208	193	176	141
1896...	268	230	218	211	213	206	197	195	174	165	124
1897..	268	231	217	214	210	203	195	201	187	176	134
1898...	249	210	210	196	196	195	187	185	187	157	138
1899...	250	217	199	195	185	188	188	174	172	154	133
1900...	256	214	197	191	192	185	191	178	176	155	137



If the figures just given be looked into it will be seen that there have been very striking changes in the rates for the period, and a persistent and astonishing decline amongst women of every class. Reading the figures with those relating to first births it would seem that an increasingly large number of women make up their minds on marrying not to have children, or to delay child-bearing as long as possible. After each successive confinement an increasing proportion of women still of child-bearing age cease to give birth to any more children, and the extraordinary condition of affairs has now come to pass that the fertility of women who have had two children is less than that of women in 1891 who had given birth to nine children.

The fall in the proportion of births during the ten years has been greatest in the group of women who have had one child only, and, generally speaking, the ratio of reduction lessens as the number of previous issue increases. Dividing the decade into two periods it will be seen that the fall for nearly every group was much greater up to 1896 than since that year, and this may be taken to indicate that the decline in the proportion of births in some of the groups has been checked; nevertheless, there is not yet any indication of a return to the higher ratios of previous years. When, however, the remarkable fact is taken into consideration that the average period elapsing between the births of each of the last five children is no greater than that from marriage to the birth of the first child, it will be evident that, though the majority of women now become infertile at an early age, or refuse to bear any more children, there is still a large section of the community to whom the practice of prevention is unknown, and who accept child-bearing as a condition of married life from which they do not take means to escape. In thus resigning themselves to the bearing of large families, there are some who are influenced by the force of religious scruples, and these comprise a large proportion of the child-bearing class; there are others to whom children come as an acceptable burthen—they believe in the scriptural counsel, “Happy is the man who hath his quiver full”; but it is to be feared that by no means the smallest class comprises those who, unfit for the responsibilities of a large family, are as fertile as they are unfit.

It would have been interesting to pursue the inquiry further, in order to discover whether the birth-rate has declined more in one class of the population than in another, but the information available does not admit of this being done with that satisfying accuracy that statistics can alone supply.

The following table shows (*a*) the births per thousand women who have had previous issue of the number stated in the first column, (*b*) the age at which such women bear their children, (*c*) the average number of issue per thousand newly married women, and (*d*) the average per thousand of all women. The last includes the other two classes, as well as other women of the age stated, who have either less or more issue than indicated in the first column. The interest of the table lies in a comparison of the ratios for women with the specified issue, and for newly married women. It will be seen that the newly married have a greater probability of issue than women of the same age who have borne not more than four children; for women with a greater number of children than four, newly married women of like age have less probability of issue, and the probabilities in favour of the women of proved fertility greatly increase in accordance with the increase in the number of their children, until at age 37·9 years, a woman with seven children has twice the probability of giving birth to a child than has a newly married woman of like age; and at age 41·3 years the probability of a woman with nine children becoming a mother is more than seven times that of a

newly married woman of equal age. The question of the comparative fertility of the newly married and other women is returned to in the next chapter, wherein the effect of marriage postponement on fertility is further discussed.

Previous Issue.	Average Age of Mother.	Births per 1,000 Women.		
		With Issue as stated.	Newly Married of age stated.	All Women of age stated.
1 .....	25·6	285	350	277
2 .....	28·0	239	286	259
3 .....	30·2	231	255	240
4 .....	32·2	224	238	221
5 .....	33·9	221	190	205
6 .....	35·9	213	127	184
7 .....	37·9	208	100	147
8 .....	39·6	204	68	137
9 .....	41·3	197	26	109
10 .....	44·3	176	0	50



# Effects of Postponement of Marriage on Fertility.

WOMEN who have demonstrated their fecundity by having given birth to a child are, as regards fertility, in a different category to married women without issue. Amongst the latter there are many women who have been married for lengthened periods without having given birth to a child, and in regard to whom absolute barrenness may be assumed. To ascertain what effect postponement of marriage has on the child-bearing capacity, women of proved barrenness should be excluded from comparison, which should be restricted to the probability of a child being born to a married woman within the year following her marriage, and the probability of further issue to the women of equal ages, who already have been mothers.

If the newly married women be arranged according to their ages, and their numbers be compared with the first births within a given period after marriage, what is termed the initial fertility of a married women may be ascertained. This, for the women marrying during the ten years, 1891–1900, was as shown in the following statement; two rates are given, viz.—the expectation (*a*) within a year, and (*b*) within two years of marriage, births of ante-nuptial conception being of course excluded :—

Age at Marriage.	Probability of a Birth.		Age at Marriage.	Probability of a Birth.	
	Within a year of Marriage per 1,000 wives.	Within 2 years of Marriage per 1,000 wives.		Within a year of Marriage per 1,000 wives.	Within 2 years of Marriage per 1,000 wives.
17	397	724	32	242	383
18	398	730	33	220	366
19	397	733	34	187	331
20	397	731	35	144	287
21	396	694	36	125	261
22	394	615	37	111	236
23	386	571	38	99	209
24	376	556	39	82	161
25	362	548	40	58	114
26	342	541	41	32	74
27	320	525	42	12	45
28	286	488	43	.....	31
29	265	454	44	.....	19
30	256	419	45	.....	14
31	250	396	.....	.....	.....

It will be seen that the summit of initial fertility is at the beginning of the child-bearing period, and extends without any diminution to the twenty-second or twenty-third year of age; then it rapidly falls away, so that before age 30 is reached, the fertility has declined by one-third, and at age 34, by considerably more than one-half. Comparing the fertility of the newly married with that of women who have borne children, it will be found that, as between women of the same age, there is an absolute superiority of the newly married at the earlier age, and this continues until age 28 is reached,

when the probabilities are reversed; and at age 38, the probability of a newly married woman having a child within the ensuing twelve months is less than half that of a woman with previous issue, and at age 41 years, it is only one-fourth. It would thus appear that the reproductive system, if unused, is apt to become inoperative, as it cannot be supposed that prevention is practised more amongst women newly married than amongst those who have already had experience of the troubles of maternity.

When a woman has proved fecund, her fertility continues with little impairment until her thirtieth year, and possibly even beyond that age; thence it declines very gradually; whereas amongst the newly married there is a very rapid decline in fertility after age 30 has been passed. The probability of a newly married woman having a child is extinguished about her forty-third year, at which age there will still be born one child to every ten women with previous issue. In the following statement the figures for newly married women are repeated and set side by side with the figures representing the probability of a birth to women who have already been mothers.

The following shows the probable number of births within a year amongst every 1,000 women of each class:—

Age.	Newly-married Women.	Women with Previous Issue.	Age.	Newly-married Women.	Women with Previous Issue.
21	396	281	34	187	238
22	394	281	35	144	234
23	386	270	36	125	228
24	376	272	37	111	217
25	362	290	38	99	207
26	342	299	39	82	189
27	320	298	40	58	155
28	286	292	41	32	134
29	265	286	42	12	115
30	256	274	43	.....	94
31	250	263	44	.....	66
32	242	253	45	.....	35
33	220	244			



## Number of Children to Marriages lasting through the whole period of Child-bearing.

It has been usual amongst statisticians to estimate the average number of children born to a marriage by an empirical formula based on the results of the Swedish observations. To arrive at such average, the number of legitimate births in a given year is divided by the number of marriages contracted in a twelvemonth six years previously, the interval between the mean age of marriage and the mean age of mothers corresponding to that period. This rule cannot be applied to New South Wales or to Australia generally, where the marriage rate has been declining for a considerable period; there is, however, no necessity to have recourse to any formula, as the number of children to a marriage can be directly ascertained from the registration of the deaths of married people, the issue of every person who dies being enumerated in the record of his or her death; it can also be ascertained indirectly from the registration of births, and over and above this, at the Census of 1901, the number of children to each married woman then living in the State was ascertained. The information available, therefore, is ample to determine all the necessary facts bearing upon the investigation.

From what has already been written, it will have been gathered that the fertility of married women has greatly declined, and it is important to determine how far this decline has affected the number of children born to a marriage. There is no difficulty in establishing, direct from the statistics, the number of children born to the earlier marriages, but, in regard to recent marriages, the number cannot be determined without having recourse to calculation, for though the number of children born up to the present time is known, there are many marriages whose tally of children is not complete, and it is necessary to allow for the unfulfilled or probable future fertility of such marriages. This can be done readily by using the figures given in an earlier chapter.

The probability of a birth to a married woman of a given age has already been calculated; this, with an allowance for initial fertility, and for births due to ante-nuptial conception, an important consideration in earlier years, enables the following estimate to be made. It will be understood that the calculation assumes that the marriage in every case remains unbroken through the whole period of child-bearing, which, in this instance, has been taken as up to fifty years. The following figures relate to marriages contracted during the ten years 1891–1900:—

Age at Marriage.	Average Issue.	Age at Marriage.	Average Issue.	Age at Marriage.	Average Issue.
20	5·395	31	2·287	42	·311
21	5·085	32	2·054	43	·215
22	4·776	33	1·831	44	·140
23	4·470	34	1·617	45	·085
24	4·168	35	1·413	46	·047
25	3·874	36	1·218	47	·024
26	3·588	37	1·035	48	·011
27	3·309	38	·863	49	·005
28	3·040	39	·704	50	·002
29	2·780	40	·558		
30	2·530	41	·426		



The actual ascertained issue of earlier marriages was as shown in the statement given hereunder. In connection with this statement it should be remembered that all marriages contracted prior to 1875 are completed so far as concerns the expectation of issue, inasmuch as all the women who were parties to them have lived through the child-bearing period. Such is also the case for all other wives except those who married since 1881, and whose age at marriage was less than 25 years, and for wives under 30 years who married since 1886. The unfulfilled expectation for such wives has been calculated, and the adjusted expectation inserted in the table, otherwise the figures are the actual results of direct observation. It is believed that the calculated figures fairly represent the probabilities of the case; but, however that may be, their absolute accuracy is not necessary to sustain any of the conclusions arrived at.

AVERAGE issue of women marrying at stated age and living through period of child-bearing.

Period of Marriage.	Marriage Age Groups.					
	15 and under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.
1851-55	9·918	8·679	6·821	4·615	3·500	3·000
1856-60	9·926	8·440	6·437	5·107	2·143	1·500
1861-65	9·779	8·318	6·407	4·636	2·915	1·350
1866-70	9·371	8·097	6·451	4·379	2·235	1·235
1871-75	8·867	7·521	5·888	4·149	2·534	·940
1876-80	.....	7·022	5·392	3·923	2·095	·852
1881-85	.....	.....	4·972	3·396	1·797	·603
1886-90	.....	.....	.....	3·026	1·717	·547

The first point to be observed in connection with the foregoing table is the very large average issue shown for early marriages. Some incredulity was displayed when similar figures were given by the author in a paper read before the Royal Statistical Society; and in order to meet any similar objections, it has been thought well to give the actual statistics showing these rates. The following information was obtained at the Census of 1901. The figures represent all the women 45 years and over then living who were married between the years 1850 and 1870.

Marriage Age Groups.	Number of Married Women.	Number of Children.	Average per Married Woman.
15 and under 20	7,889	76,264	9·667
20    ,,    25	10,021	83,026	8·285
25    ,,    30	3,239	20,943	6·466
30    ,,    35	838	3,826	4·566

There can be no question but that the women who came to Australia between 1850 and 1870, and who form a large proportion of the older married women now living, were of a type likely to be prolific in children, and the evidence of the fruitfulness is seen in the foregoing table. Nor was the Australian-born woman of the same period any less fruitful, as will presently appear.

The second point in regard to the table of average issue is the great decrease in the number of children born to recent marriages as compared with



former marriages. It is convenient in considering this matter to group the information available under three periods, viz., for years prior to 1870, which may be termed the earlier period; for the years between 1870 and 1880; and for the years 1891 to 1900, which may be conveniently termed the recent period. The average issue to women marrying in each of the periods is given below, but it should be understood that for the middle period the experience of the marriages at the earliest age groups has had to be completed in respect of some women, whose period of child-bearing had not been completed at the close of the year 1900, ample material for the completion of such experience being available.

Period of Marriage.	Marriage Age Groups.					
	15 and under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.
Prior to 1870.....	9·667	8·285	6·466	4·566	2·474	1·385
1871-1880 .....	8·606	7·232	5·610	4·020	2·265	·882
1891-1900 .....	.....	4·776	3·309	2·054	1·035	·311

There appears from the table just given to have been a decline in the average number of children to a marriage from period to period, marriages of recent years showing the least number of children. The decline from the first to the second period is not large, and is explainable on the well-known fact that the women who came to Australia in the gold-digging days and in the two following decades were, as a class, above the ordinary fertility of the time, and there is no reason to suppose that in the second period any general effort was made to limit the number of children born. The practice alluded to came into vogue between 1881 and 1890, and its full effect is now being felt on the birth-rate of the State. Comparing the marriages of the period 1871-1880, with those of 1891-1900, there has been a decline in each age group as follows:—

Age Group. Years.		Decline in Number of Children. Per cent.	
20 and under 25 .....		34	
25       ,,     30 .....		41	
30       ,,     35 .....		49	
35       ,,     40 ..		54	
40       ,,     45 .....		62	

It would thus appear that the effects of prevention are visible amongst women marrying at all ages, but are increasingly evident as the age at marriage advances.

## Average Number of Children to all Marriages.

THE foregoing pages show that the age of a woman at marriage is the chief factor in determining the number of her children, the younger the age the more numerous the offspring, and this rule appears to hold even when a woman marries at an immature age. The number of children borne by women marrying at various ages is set out in the tables of the preceding chapter on the supposition that the marriage of every woman lasts through the full period of her child-bearing. A large number of women do not, of course, have this experience; their marriage is broken by their own death or the death of their husbands. The average number of children likely to be born to women marrying at any given age, allowing for those who die or become widows before completing the full period of child-bearing, can be ascertained by direct observation or by calculation from the average of fertility at each age, using a joint life table to determine the number of marriages that will be broken by death during each year of life time after marriage. Such a life table was computed for New South Wales from materials obtained at the Census of 1891, and as little change has since taken place, this table has been employed for the purpose of estimating the number of children to present day marriages. The following are the results: the calculations themselves present no features of special interest, and therefore need not be reproduced in these pages:—

MARRIAGES of 1891–1900. All Women.

Age at Marriage.	Average Number of Children.	Age at Marriage.	Average Number of Children.	Age at Marriage.	Average Number of Children.
20	4·996	30	2·395	40	·523
21	4·719	31	2·176	41	·390
22	4·444	32	1·966	42	·275
23	4·171	33	1·761	43	·182
24	3·896	34	1·564	44	·113
25	3·624	35	1·373	45	·060
26	3·360	36	1·193	46	·033
27	3·105	37	1·013	47	·007
28	2·857	38	·844	48	·003
29	2·620	39	·674	49	·001

That there has been a great decline in fertility during recent years has been made abundantly manifest in the foregoing pages; an actual measure of this decline can now be given by setting against the figures in the preceding table the average issue of women marrying at earlier periods.

The average number of children born to women who married between the years 1871 and 1880 is shown for each age at marriage in the following table; the figures have been arrived at by using the table for joint lives employed for calculating the issue of recent marriages, the annual birth rate to women of different ages being that shown in the chapter dealing with the



birth rate according to age of mother. An allowance has been made in this as in the table dealing with recent marriages for the initial fertility at each age and for ante-nuptial conception.

MARRIAGES of 1871-1880. All Women.

Age at Marriage.	Average Number of Children.	Age at Marriage.	Average Number of Children.	Age at Marriage.	Average Number of Children.
20	7.051	30	3.882	40	.979
21	6.727	31	3.581	41	.763
22	6.409	32	3.286	42	.588
23	6.089	33	2.984	43	.445
24	5.762	34	2.691	44	.330
25	5.437	35	2.393	45	.233
26	5.116	36	2.105	46	.159
27	4.802	37	1.810	47	.100
28	4.489	38	1.526	48	.050
29	4.184	39	1.233	49	.010

By comparing the two tables (1871-1880 and 1891-1900), it will be seen that whereas in the former period there was an even chance of a child being born to a woman marrying at 42 years of age, this is now reduced to women marrying at age 40. Women whose marriage is postponed until they are in their thirty-second year cannot now expect more than two children, and those who marry after age 27 not more than three. According to the earlier experience women marrying at age 36 might expect two children, and at age 33 three children. The full extent of the decline may be gathered from the following summary:—

Age at Marriage.	Children to a Marriage.	
	Marriages of 1871-80.	Marriages of 1891-1900.
20 and under 25 .....	6.409	4.444
25 „ 30 .....	4.802	3.105
30 „ 35 .....	3.286	1.966
35 „ 40 .....	1.810	1.013
40 „ 45 .....	.588	.275
All Ages.....	5.384	3.636

Applying the figures herein obtained to the women marrying at these different periods, it is found that the issue to marriages of 1871-80 was 5,384 to every 1,000 marriages, whereas under present conditions the number of issue would be 3,636. This denotes a decrease of 32.5 per cent. in the fertility of marriages, and a like reduction in the birth rate. The elements of the decline may be resolved into (a) postponement of marriage on the part of women (b) reduction in fecundity and the comparative increase of childless marriages (c) the earlier cessation of fertility, and (d) the decline in the fertility of fecund marriages. Of the 1,748 less children now being born than to earlier marriages, the loss of 301 may be attributed to postponement of marriage; 236 to the decline in fecundity, and 1,211 to the cessation of fertility at an earlier period than formerly, and to a generally decreased fertility at every age.

## Fertility in relation to Birthplace and Religious Belief.

THE question of the fertility of women of different nationalities is one of much importance, but in New South Wales, as already explained, the great majority of women are of British birth or parentage, the women of other races being too few to admit of any accurate idea of their fertility being obtained.

Two sets of figures are available to illustrate fertility in relation to birth-place. The first of these comprises information as to the issue of all women living in the state at the date of the Census of 1901, and the second, the annual birth-rate amongst women of different nationalities during the same year. The first includes both women of earlier and women of more recent marriage, and in view of the great fall in the birth-rate it is desirable to eliminate women of recent marriage, and thus reduce the information so as to illustrate the experience of marriages contracted prior to the year 1880. This can best be done by including only women who have lived through the whole period of child-bearing, and this course has been followed in the accompanying table, which represents in effect, for marriages contracted prior to 1881, the average number of children born to women marrying at the ages specified, and born in the countries named:—

Age of Women at Marriage.	Birth-place of Married Women.					
	New South Wales.	Other Australian States.	England and Wales.	Scotland.	Ireland.	Other Countries.
20 and under 25 .....	8·23	7·45	7·27	7·78	7·66	7·58
25     ,,     30 .....	6·10	5·30	5·32	5·64	5·70	5·66
30     ,,     35 .....	4·09	3·19	3·43	3·84	3·66	3·27
35     ,,     40 .....	2·04	1·72	1·75	1·62	1·70	1·88
40     ,,     45 .....	0·60	0·66	0·52	0·50	0·61	0·42

It will be seen that there is no great range in the number of children to women of the various nationalities included in the list, any variation disclosed being due rather to difference in social conditions than to any other cause. Women of Australian birth show somewhat greater fertility than non-Australians; amongst the latter, the Scotch have a slight superiority over the Irish, and the Irish over the English, at almost every age. It must be remembered that these figures denote a past experience, somewhat higher perhaps than that of 1871–1880, and corresponding fairly closely with that of all marriages contracted prior to 1880. They may be taken as illustrating the natural fertility of women of the races named, unimpaired by resort to any form of artificial restriction.

The present fertility of these women is a very different matter. It may be ascertained by a comparison of the number of women of each nationality



now living with the births occurring amongst them during the last few years. The annual rates thus derived are as follow :—

Age.	Present Annual Birth-rate to Wives born in—				
	New South Wales.	Other Australasian States.	England.	Scotland.	Ireland.
18 and under 20.....	·501	·438	·522	·480	·596
20 „ 25.....	·391	·380	·424	·403	·571
25 „ 30.....	·308	·297	·280	·322	·472
30 „ 35.....	·242	·231	·226	·274	·341
35 „ 40.....	·203	·175	·192	·224	·215
40 „ 45.....	·096	·079	·089	·090	·066

These rates include births of ante-nuptial conception, and for the younger ages are somewhat in excess of the truth, but as ante-nuptial intercourse is not confined to any particular class, it may be assumed that the rates are all much upon the same basis. In order to compare the effect of the existing rates on the constitution of families, it will be necessary to calculate the average number of children to women marrying at each age and for women of each birthplace. This has been done, and is shown in the following table, the age groups being the same as those just given.

Age at Marriage.	Number of children to a Marriage at specified age to Women born in—			
	New South Wales.	England.	Scotland.	Ireland.
20 and under 25.....	4·820	4·565	5·103	6·398
25 „ 30.....	3·266	3·027	3·514	4·116
30 „ 35.....	2·062	1·922	2·205	2·236
35 „ 40.....	1·068	·978	1·069	·924
40 „ 45.....	·293	·272	·254	·173

The women of Irish birth show no great diminution of fertility now as compared with former years ; amongst all other classes of women there has been a considerable decline. As late as 1880, Irish women did not show a rate of fertility in excess of the rest of the community, but now, except as the end of the child-bearing period approaches, their fertility shows conspicuously above the average of all other women. As the decline in number of children born may in a large degree be attributed to the use of preventive measures, Irish women must, as a class, be acquitted of this practice. Whether their exemption from this prevalent custom is the result of religious scruples or racial tradition need not be here determined, but some light will be thrown on the subject when the question of fertility in relation to religious belief is discussed.

It is clear that failure to bear children is not specially characteristic of Australian-born women, it is a habit shared by them with women of English origin, and in a less degree with women born in Scotland. It is a curious circumstance that though Irish women are much more prolific than other women, their daughters of Australian birth are not distinguished in this respect from other Australian women, otherwise the rates for these latter women would stand higher than they do, inasmuch as women of Irish parentage form nearly 30 per cent. of the Australians born.

The question of religion as affecting fertility can be determined in much the same way as that in regard to nationality. Taking the women at the census

of 1901 who had passed through the child-bearing stage, no great differences are discoverable between one class and another. Roman Catholic wives show the largest number of children for almost all ages, then the Methodists and the Presbyterians, with the Church of England lowest of the Christian denominations. Jewish women show less fertility than the women of any other class. As the great majority of the births on which the averages are founded occurred before any general system of prevention seems to have been fashionable, it must be concluded that the differences in the rates disclosed by the following table are due to social habits rather than to differences in inherent fertility.

Age of Women at Marriage.	Church of England.	Roman Catholic.	Methodist.	Presbyterian.	Jews.	Other Religions.
Under 20 years .....	9·54	9·66	9·62	9·43	8·38	9·18
20 and under 25 .....	7·69	8·11	7·83	7·80	7·50	7·19
25 „ 30 .....	5·56	5·99	5·83	5·79	4·71	5·46
30 „ 35 .....	3·60	3·77	4·10	3·86	3·53	3·53
35 „ 40 .....	1·84	1·91	1·96	1·73	1·09	1·61
40 „ 45 .....	0·57	0·62	0·49	0·49	0·50	0·51

The condition of fertility shown in this statement does not of course, any longer exist, and it is unfortunately impossible to give similar information for present day marriages, as the religion of the parents is not ascertained when the birth of a child is registered. There is, however, strong indirect evidence which shows the fertility of women of different religions at the present time compared with one another, and indirectly compared with past years. If the average birth-rate to a certain number of mothers within the child-bearing age be taken as 100, the rates for women of the religious beliefs most numerously represented, and for which there is information, are as follow:—

Roman Catholic .....	113
Church of England.....	101
Methodist.. .....	100
Presbyterian .....	95
Baptist .....	87
Congregationalist .....	86
Jewish .. .....	71

Roman Catholic women show a much greater degree of fertility than women of any other religion, but it is evident that this superiority is due mainly to the number of women of Irish birth represented in the Roman Catholic population. If the present rates for women of different birth-places be reduced to the same common standard as those just given for religions, the following proportions are obtained :—

Women born in Ireland.....	135
„ „ Scotland .....	107
„ „ New South Wales.....	101
„ „ England .....	97
„ „ Other Australian States .....	94

It will be thus seen that the average for women born in Ireland is 135, compared with 113 for all Roman Catholic women. About 24 per cent. of the Roman Catholic married women under 45 years of age are of Irish birth, and the measure of fertility of the two classes of Roman Catholic women is therefore :—

Roman Catholic women—Irish birth .....	135
„ „ Other birth, including Australians...	106
„ „ All birth-places .....	113



Both classes show superior fertility to women of other religions, but, whereas Roman Catholic women of Irish birth show an almost undiminished fertility compared with women married prior to 1880, those of other birth show a very great decline. It must be concluded, therefore, that, speaking generally, the effect of religion as a deterrent to the practice of prevention is not particularly obvious.

Allusion has been made to the fact that women are usually more fecund with husbands of their own race than with other husbands; it will now be seen that they are, as a rule, more fertile also. To make a fair comparison between women of different classes it is necessary to group them according to a standard population, and the following figures, therefore, have been so arranged, the distribution of married women according to their ages at the census of 1901 being taken as the standard. If the fertility of women married to husbands of the same birth-country as themselves be taken as equal to 100, then their fertility with husbands of different origin would be as shown in the following statement:—

New South Wales.....	89
Other Australian States ..	93
England .....	99
Scotland .....	92
Ireland .....	92
Germany.....	96

In considering these figures, it should be remembered that they have no value relative to one another, they simply indicate that for every hundred children born to women of the birth-places specified, who have husbands of the same birth-place, there will be born the number indicated when the husband's birth-place differs from that of his wife. Thus, comparing women born in New South Wales and women born in Ireland, the average number of children to women marrying at age 22 would, in the first case, be 4·82 when the husband is also born in New South Wales, but 4·29 if he were not born in that state; similarly, a woman born in Ireland, and married at 22 years, may now be expected to bear 6·40 children, but with a husband of other nationality the average issue would be 5·89.

The same phenomenon is observable in regard to the marriage of women of different religions. The following is the proportionate fertility of women marrying husbands of other than their own religion, on the assumption that their fertility with husbands of their own religion is represented by 100:—

Church of England .....	87
Roman Catholic .....	89
Presbyterian .....	87
Methodist .....	91
Baptist .....	95
Congregational .....	91
Jewish.....	63

The extremely low fertility of Jewish women with husbands not of their own faith is remarkable, but the probable correctness of the figure is supported by the experience of other countries. It is difficult to account for the diminution in fertility of mixed marriages on purely physical grounds; possibly an explanation of the peculiarity may be found in the assumption that the contractors of such unions speedily exhaust the passion that brought them together as man and wife, and that the bond of religious sympathy, which might otherwise have taken its place, is entirely lacking.

As illustrating the reduced fertility of mixed marriages, the following table is given ; it shows the average number of children that will be born to present marriages of women 24 years of age—first, where the husband is of the same religion as the wife ; and secondly, where he is of a different faith :—

Religion of Wife.	Children—Wife and Husband of same religion.	Mixed Marriages.
Roman Catholic .....	4·57	3·98
Church of England.....	4·02	3·58
Methodist .....	3·90	3·55
Presbyterian .....	3·81	3·31
Baptist .....	3·43	3·26
Congregationalist .....	3·42	3·11
Jewish .....	2·81	1·77



## Families of Various Sizes.

It must not be supposed that the decline in fertility means that there are no longer large families. Observations have been made of the previous issue of every woman who gave birth to a child since 1893, and it would appear that the 281,375 children born in the eight years were thus distributed :—

1st children.....	56,649	9th children.....	9,804	17th children .....	70
2nd „ .....	46,450	10th „ .....	6,830	18th „ .....	22
3rd „ .....	39,269	11th „ .....	4,417	19th „ .....	15
4th „ .....	32,569	12th „ .....	2,534	20th „ .....	3
5th „ .....	27,054	13th „ .....	1,362	21st „ .....	0
6th „ .....	21,964	14th „ .....	685	22nd „ .....	2
7th „ .....	17,606	15th „ .....	342	23rd „ .....	1
8th „ .....	13,597	16th „ .....	130		

Of course, the same women appear again and again in the list as the mothers of first, second, third, &c., children, and the table has value only as showing that large families are still being produced. The figures must not be used as indicating the proportions of each description of family; this is information that can be obtained only from a census or the record of the deaths of married women.

At the Census of 1901 it was ascertained that in every 1,000 married women whose husbands were then living, the proportions with families of the numbers indicated were as shown in the following statement. The numbers include the dead as well as the living issue :—

Number of Children.	Number of Women per 1,000, with families of size indicated.	Number of Children.	Number of Women per 1,000, with families of size indicated.
0	132	9	43
1	131	10	37
2	123	11	25
3	109	12	18
4	94	13	10
5	82	14	6
6	71	15	3
7	61	16 and over	2
8	53		

The foregoing table does not include the families of women whose husbands are dead, while it does include the women whose period of child-bearing is incomplete. The latter class forms a large proportion of the whole, and tends to increase unduly the proportion of families of four and under, and correspondingly decrease the proportion of families of five children and upwards.

The records relating to the 22,115 married women who died in the eight years that ended with 1900 afford much better information. Apart from the fact that the days of these people had been counted out, their number includes widows whose life experience is necessary to complete the table of

families. A classification of these persons according to the number of children born is as follows :—

Number of Children.	Number of Deaths of Married Women—Issue as stated.	Proportion per 1,000 of Mothers of each class.	Number of Children.	Number of Deaths of Married Women—Issue as stated.	Proportion per 1,000 of Mothers of each class.
0	2,600	118	9	1,399	63
1	1,989	90	10	1,199	54
2	1,853	84	11	856	39
3	1,760	80	12	624	28
4	1,881	85	13	352	16
5	1,891	85	14	178	8
6	1,846	83	15	79	4
7	1,797	81	16	53	2
8	1,717	78	Over 16	41	2

The largest family that has, so far, come under observation in New South Wales is that of a man whose children numbered 29. The woman who had the largest family had given birth to 23 children ; this large number did not include any plural births.

The families of married men who died during the same period have been tabulated, and show a slightly greater average than for women. This will be readily understood when it is remembered that, owing to the larger proportion of re-marriages amongst widowers than widows, there are more women who become mothers than men who are fathers. The difference, however, is too small to call for any special remark.



## Joint Ages of Parents as Affecting Birth-rates. Bigenous Natalitiy.

IT needs no argument to prove that possible fertility is a very different thing to fertility displayed by marriage. The bearing of children not only requires fecundity on the part of both husband and wife, but the will to bear. The probability of issue during a year to a given number of couples of various ages when arranged in a regular form is called a table of bigenous natalitiy. Such a table has been compared to a joint-life table; between the two there is, however, but a surface resemblance. A joint-life table treats of the happening of something which both parties are desirous should happen, viz. :—the living through a given period, and over which neither party has control. A table of bigenous natalitiy depends on the probability of the parties living through the period to which the table refers, on their respective fertility, and on the exercise of their powers of reproduction—that is to say, on two circumstances governed by strict laws, and another set of circumstances controlled by the parties themselves, and therefore of a voluntary character. Nevertheless, it is not impossible to imagine that what appear to be purely voluntary actions may be exercised according to calculable rules. Many cases seem to conform to this supposition. Amongst those of common occurrence it may be pointed out that although persons who marry are, ordinarily speaking, not subject to any compulsion, but perform an action essentially voluntary, yet the marriage rates of the community are extremely regular and easily predicted from year to year. The number of persons who will be arrested for drunkenness in any year can be predicted with some certainty, yet there are many causes which must be in operation before an arrest is possible. So also with many other events in which voluntariness apparently forms an important part. So little variation do the averages show that even where there is an increase or decrease in the annual proportions, it is so gradual as to admit of being easily forecast. With almost as much certainty as an individual knows the number of loaves his family will require from the baker, does the statistician know the number of crimes to be committed during the year, the number of unfortunates who will commit suicide, the number of fires that will occur, the number of persons who will be carried from the streets to the hospital, and from the hospital to their last rest. From the experience of the years that have been counted out can be told what will happen in the years that are to come. Men themselves do not change. The desires and appetites which move them to-day are the same that swayed the race before the pyramids were built, and will remain unchanged to the end. May it not be true therefore that though the conception of children is subject to the control of one or both parties, the actual exercise of that control or its non-exercise is governed by rule.



JOINT AGES OF PARENTS AS AFFECTING  
Birth-rate per 100 Couples

AGE OF HUSBAND.	AGE OF WIFE												
	22	23	24	25	26	27	28	29	30	31	32	33	34
22	30.3	30.3	30.2	30.1	30.0	29.7	29.1	28.1	27.0	26.1	25.1	24.2	23.3
23	30.3	30.2	30.0	29.8	29.7	29.3	28.8	28.0	27.0	26.2	25.4	24.6	23.7
24	30.4	30.1	29.8	29.5	29.4	28.9	28.4	27.8	27.0	26.3	25.6	24.9	24.0
25	30.4	30.0	29.6	29.2	29.1	28.5	28.0	27.5	26.9	26.4	25.8	25.1	24.3
26	30.4	29.9	29.4	29.0	28.8	28.1	27.6	27.2	26.7	26.3	25.9	25.2	24.4
27	30.4	29.8	29.2	28.8	28.5	27.8	27.3	26.9	26.5	26.2	25.8	25.2	24.5
28	30.4	29.7	29.1	28.6	28.2	27.5	27.0	26.6	26.3	26.0	25.6	25.0	24.3
29	30.5	29.7	29.0	28.4	27.9	27.2	26.7	26.3	26.0	25.7	25.3	24.7	24.0
30	30.5	29.7	28.9	28.2	27.6	27.0	26.5	26.1	25.7	25.3	24.9	24.3	23.6
31	30.5	29.7	28.9	28.2	27.5	26.8	26.3	25.8	25.4	24.9	24.4	23.8	23.1
32	30.5	29.7	28.9	28.2	27.3	26.6	26.1	25.5	25.1	24.5	24.0	23.4	22.7
33	30.5	29.7	28.8	28.1	27.1	26.4	25.9	25.2	24.8	24.1	23.6	23.0	22.3
34	30.4	29.6	28.7	27.9	26.9	26.2	25.6	24.9	24.4	23.7	23.2	22.6	21.9
35	30.3	29.5	28.6	27.7	26.7	26.0	25.3	24.6	24.0	23.3	22.8	22.2	21.5
36	30.1	29.3	28.4	27.4	26.4	25.7	25.0	24.3	23.6	22.9	22.3	21.7	21.0
37	29.7	28.9	28.0	27.1	26.1	25.4	24.7	24.0	23.2	22.5	21.8	21.2	20.5
38	29.2	28.4	27.6	26.7	25.8	25.1	24.4	23.6	22.8	22.1	21.4	20.8	20.1
39	28.5	27.8	27.0	26.2	25.4	24.7	24.0	23.2	22.4	21.7	21.0	20.4	19.7
40	27.7	27.0	26.3	25.6	24.9	24.2	23.5	22.8	22.0	21.4	20.7	20.1	19.4
41	26.8	26.2	25.5	24.9	24.2	23.6	23.0	22.4	21.6	21.0	20.4	19.8	19.1
42	25.8	25.3	24.7	24.2	23.6	23.1	22.5	22.0	21.3	20.7	20.1	19.5	18.8
43	24.9	24.5	23.9	23.5	23.0	22.6	22.1	21.6	21.0	20.4	19.8	19.2	18.5
44	24.1	23.7	23.2	22.9	22.5	22.2	21.7	21.3	20.7	20.2	19.6	19.0	18.3
45	23.5	23.2	22.8	22.6	22.2	21.9	21.4	21.0	20.5	20.0	19.4	18.8	18.1
46	22.9	22.7	22.4	22.3	21.9	21.6	21.1	20.7	20.3	19.8	19.2	18.6	17.9
47	22.4	22.3	22.1	22.0	21.7	21.4	20.9	20.5	20.1	19.6	19.0	18.4	17.7
48	21.9	21.9	21.8	21.7	21.5	21.3	20.8	20.4	20.0	19.5	18.9	18.3	17.6
49	21.5	21.5	21.5	21.4	21.3	21.1	20.7	20.3	19.9	19.4	18.9	18.3	17.6
50	21.2	21.2	21.2	21.2	21.1	20.9	20.6	20.2	19.8	19.3	18.8	18.3	17.6
51	20.9	21.0	21.0	21.0	21.0	20.8	20.5	20.2	19.8	19.3	18.8	18.3	17.6
52	20.6	20.8	20.8	20.8	20.8	20.7	20.4	20.1	19.7	19.2	18.7	18.2	17.5
53	20.4	20.6	20.7	20.7	20.7	20.6	20.3	20.0	19.7	19.2	18.7	18.2	17.5
54	20.3	20.4	20.5	20.5	20.5	20.4	20.2	19.9	19.6	19.1	18.6	18.1	17.4
55	20.2	20.3	20.4	20.4	20.4	20.3	20.1	19.8	19.5	19.1	18.6	18.1	17.4
56	20.1	20.2	20.3	20.3	20.3	20.2	20.0	19.7	19.4	19.0	18.5	18.0	17.3
57	20.0	20.0	20.1	20.1	20.1	20.0	19.9	19.6	19.3	18.9	18.4	17.9	17.2
58	19.9	19.9	20.0	20.0	20.0	19.9	19.8	19.5	19.2	18.8	18.3	17.8	17.1
59	19.8	19.8	19.9	19.9	19.9	19.8	19.7	19.4	19.1	18.7	18.2	17.6	16.9
60	19.7	19.7	19.8	19.8	19.8	19.7	19.6	19.3	19.0	18.6	18.1	17.4	16.7
61	...	...	...	...	...	...	...	...	...	...	18.0	17.1	16.4
62	...	...	...	...	...	...	...	...	...	...	17.8	16.8	16.1



BIRTH-RATES—BIGENOUS NATALITY.  
by the Joint Ages Stated.

WIFE.													AGE OF HUSBAND.
35	36	37	38	39	40	41	42	43	44	45	46	47	
2.8	22.2	21.2	19.8	17.8	15.3	12.1	7.9	...	...	...	...	...	22
3.1	22.5	21.5	20.1	18.1	15.6	12.5	8.4	...	...	...	...	...	23
3.3	22.7	21.7	20.3	18.3	15.8	12.8	8.9	...	...	...	...	...	24
3.5	22.9	21.9	20.4	18.3	15.8	13.0	9.4	...	...	...	...	...	25
3.6	22.9	21.9	20.3	18.3	15.8	13.1	9.8	...	...	...	...	...	26
3.6	22.8	21.8	20.2	18.2	15.8	13.2	10.2	8.2	6.4	4.7	2.9	1.1	27
3.5	22.7	21.7	20.1	18.1	15.7	13.2	10.5	8.4	6.6	4.8	3.0	1.1	28
3.3	22.5	21.5	19.9	17.9	15.5	13.1	10.7	8.6	6.7	4.9	3.0	1.1	29
3.0	22.2	21.2	19.6	17.6	15.3	13.0	10.8	8.7	6.8	5.0	3.1	1.2	30
2.6	21.9	20.9	19.3	17.3	15.1	12.9	10.7	8.6	6.8	5.0	3.1	1.2	31
2.2	21.6	20.6	19.1	17.1	15.0	12.8	10.7	8.6	6.8	5.0	3.1	1.3	32
1.8	21.2	20.2	18.8	16.8	14.8	12.7	10.6	8.5	6.8	5.0	3.1	1.3	33
1.3	20.7	19.7	18.4	16.4	14.5	12.4	10.4	8.3	6.6	4.9	3.0	1.3	34
0.8	20.2	19.2	18.0	16.0	14.2	12.2	10.3	8.2	6.5	4.8	3.0	1.3	35
0.4	19.8	18.8	17.6	15.7	13.9	12.0	10.1	8.1	6.4	4.7	3.0	1.3	36
0.0	19.4	18.4	17.2	15.4	13.6	11.8	9.9	8.0	6.3	4.6	3.0	1.3	37
0.6	19.0	18.0	16.8	15.1	13.3	11.6	9.7	7.9	6.2	4.6	3.0	1.4	38
0.2	18.6	17.6	16.4	14.8	13.0	11.4	9.6	7.8	6.2	4.6	3.0	1.4	39
3.9	18.3	17.3	16.1	14.6	12.8	11.2	9.5	7.8	6.2	4.6	3.0	1.4	40
3.6	18.0	17.0	15.8	14.4	12.6	11.1	9.4	7.7	6.1	4.5	3.0	1.4	41
3.3	17.7	16.7	15.5	14.2	12.4	10.9	9.2	7.5	6.0	4.4	3.0	1.3	42
3.0	17.4	16.4	15.3	14.0	12.3	10.7	9.0	7.3	5.9	4.3	3.0	1.3	43
2.8	17.2	16.2	15.1	13.8	12.2	10.6	8.9	7.2	5.8	4.2	3.0	1.3	44
2.6	17.0	16.0	14.9	13.6	12.1	10.5	8.7	7.0	5.7	4.1	3.0	1.3	45
2.4	16.8	15.8	14.7	13.5	12.0	10.4	8.6	6.9	5.6	4.0	2.9	1.3	46
2.3	16.7	15.7	14.6	13.4	11.9	10.3	8.5	6.8	5.5	4.0	2.8	1.3	47
2.2	16.6	15.6	14.5	13.3	11.8	10.2	8.4	6.7	5.4	3.9	2.7	1.2	48
2.2	16.5	15.5	14.4	13.2	11.7	10.0	8.2	6.6	5.3	3.8	2.6	1.2	49
2.2	16.5	15.5	14.4	13.2	11.7	9.9	8.1	6.5	5.2	3.8	2.5	1.2	50
2.2	16.5	15.4	14.3	13.1	11.6	9.8	8.0	6.4	5.1	3.7	2.4	1.2	51
2.2	16.5	15.4	14.2	13.0	11.5	9.6	7.8	6.2	4.9	3.6	2.3	1.1	52
2.2	16.5	15.4	14.1	12.9	11.3	9.4	7.6	6.0	4.7	3.5	2.2	1.1	53
2.1	16.4	15.3	14.0	12.8	11.0	9.2	7.4	5.8	4.5	3.3	2.1	1.0	54
2.0	16.3	15.2	13.9	12.6	10.7	8.9	7.1	5.5	4.3	3.1	2.0	1.0	55
1.8	16.1	15.0	13.6	12.3	10.3	8.5	6.8	5.2	4.1	2.9	1.9	.9	56
1.6	15.8	14.7	13.2	11.8	9.8	8.0	6.4	4.9	3.8	2.7	1.8	.8	57
1.4	15.5	14.4	12.8	11.2	9.3	7.5	6.0	4.6	3.6	2.5	1.7	.8	58
1.1	15.2	14.0	12.3	10.5	8.7	7.0	5.6	4.3	3.3	2.3	1.5	.7	59
1.7	14.7	13.4	11.6	9.8	8.1	6.5	5.2	4.0	3.0	2.1	1.3	.2	60
1.0	13.8	12.3	10.7	9.0	7.4	5.9	4.7	3.6	2.7	1.8	1.1	.6	61
1.3	12.9	11.2	9.8	8.2	6.7	5.3	4.2	3.1	2.3	1.5	.9	.5	62



Several important investigations of the subject of bigenous natality have been made, but all seem to have the defect of ignoring ante-nuptial conceptions. This is a very material point. In New South Wales during the eight years 1893-1900, there were on the average annually 11,508 women under 20 years of age married to men aged from 20 to 25 years. To these were born within a year 4,700 children, showing an apparent birth rate of 408 per thousand; amongst the women there were, however, 2,185 who were already pregnant at marriage, and in respect of whom the certainty of having a child could be stated. The rate for the remainder of these women, viz., 9,323, is prejudiced by the certainty in regard to the other 2,185, and the true rate is therefore 4,700 less 2,185, that is to say 2,515 births to 11,508 less 2,185, or 9,323 women not pregnant before marriage. This gives nearly 270 per thousand, a very different ratio to that arrived at when ante-nuptial conceptions are not considered. In the investigations which follow, births due to ante-nuptial conception have been excluded, and the rates shown are the actual net rates.

The information available for estimating the probability of a birth to couples of given ages comprises the experience of 259,665 births to 1,374,701 couples. For women of ages up to 49 years, and for men up to 64 years, the statistics are fairly ample, and where the number of couples is small, the collateral evidence is sufficiently strong to admit of correct conclusions being arrived at. In the original investigation, the figures were arranged in cumulative groups according to quinquennial ages. The rates obtained therefrom required some slight adjustment before they could be used for comparative purposes, and the foregoing statement gives the adjusted figures proceeding in single ages for women from 22 to 47 years with husbands from 22 to 62.

It will be seen that, generally speaking, the maximum rate for mothers is with fathers of the youngest ages. Where this is not actually the case there is very slight difference between the maximum and the rate for the lowest age recorded. Thus for women of 22 years, the maximum is with husbands 29 to 33 years, viz., 30·5 per hundred wives, while at age 22 the rate is 30·3. This slight difference, even if it were not due to adjustment, is of such small moment that the truth of the general statement is in no wise impaired. The general law governing natality, therefore, is that the younger the age of the couple, the greater probability of a birth. To this law there is an exception. A woman approaching the limit of child-bearing possesses almost an equal chance of becoming a mother with a husband of or about her own age as with a younger husband. Thus at age 46 years a woman's chance of becoming a mother is from 2·2 to 3·1 per hundred wives, whether the husband's age is 27 or 45 years. When the wife is 47, the birth-rate is 1·1 per hundred with a husband of 27, or with one of 53 years, being a little higher at some of the intervening ages.

An attempt has been made, on the authority of the Budapest statistics for 1889-91, to deduce the law that there is a constant number from which if the united ages of the parents be subtracted the difference approximates to the number per cent. of parents to whom children will be born during one year; but the present investigation, covering a more extended period and a far larger number of couples, shows that this so-called law does not hold, at least in New South Wales, nor does anything analogous obtain. For such a law to exist it would be necessary that, in regard to fertility, the age of the father should be as important as that of the mother, and to obtain equal birth-rates, as the mother's age advances, an equal reduction should be made



in that of the father. Within very small limits only can this be said to be true. The following examples appear to conform to the supposed law.

Age of Wife.	Age of Husband.	Sum of Ages.	Natality per 100 couples.
22	43	65	25
25	41	66	25
28	36	64	25
31	31	62	25
33	28	61	25

In each instance the natality rate is 25 per hundred couples, and the sum of the ages does not depart very far from the mean of the series (63·6 years). If, however, the series be continued for older women whose ages with those of their husbands come near to the mean (63·6) very different results are disclosed.

Age of Wife.	Age of Husband.	Sum of Ages.	Natality per 100 couples.
35	29	64	23·3
38	26	64	20·3
41	23	64	12·5

Other ages giving equal sums by the same rule ought to give equal natality results. In the following cases the joint ages amount to 74, but the probability of a birth ranges from 1·1 to 21·4 per hundred.

Age of Wife.	Age of Husband.	Natality per 100 couples.
22	52	20·6
25	49	21·4
30	44	20·7
35	39	19·2
40	34	14·5
45	29	4·9
47	27	1·1

This so-called law was tentatively promulgated by Körösi in the *Philosophical Transactions of the Royal Society*, and illustrated by Mr. F. Galton in his communication to the *Proceedings of the Royal Society*, Vol. LV. The figures just given do not afford any countenance to it, and it must be concluded that there is not any rule of universal application by which, given the ages of husband and wife, their probable issue during a twelvemonth may be foretold by subtracting the sum of the ages from a constant number.

Though it is certain that no general law exists, such as has been claimed, it is obvious from the first series just given that there are certain ages within which the sums of the ages of husband and wife indicate somewhat equal ratios of childbirth. These sums appear to be from 45 to 73, provided the wife's age is not more than 34 years. That is to say, where the united ages of the husband and wife are from 45 to 73, the probability of the birth of a child within a year for couples with equal age sums will be the same.

The following examples illustrate this :—

Age of Wife.	Age of Husband.	Natality per 100 Couples.
--------------	-----------------	---------------------------

SUM OF AGES OF HUSBAND AND WIFE=50.

22	28	30·4
23	27	29·8
24	26	29·4
25	25	29·2
26	24	29·4

SUM OF AGES OF HUSBAND AND WIFE=60.

25	35	27·7
27	33	26·4
30	30	25·7
33	27	25·2
35	25	23·5

SUM OF AGES OF HUSBAND AND WIFE=70.

25	45	22·6
27	43	22·6
30	40	22·0
33	37	21·2
35	35	20·8

If the united ages amount to more than 73, very diverse results are obtained :—

Age of Wife.	Age of Husband.	Natality per 100 Couples.
--------------	-----------------	---------------------------

SUM OF AGES OF HUSBAND AND WIFE=75.

25	50	21·2
30	45	20·5
35	40	18·9
40	35	14·2
45	30	5·0

SUM OF AGES OF HUSBAND AND WIFE=80.

25	55	20·4
30	50	19·8
35	45	18·9
40	40	12·8
45	35	4·8

SUM OF AGES OF HUSBAND AND WIFE=85.

25	60	19·8
30	55	19·5
35	50	17·2
40	45	12·1
45	40	4·6



These series show the predominating influence of the age of the wife, and where the wife is not over 33 years of age, youth on the side of the husband partly compensates for an increase in the age of the wife. Thus the percentage of natality of women aged 25 years with husbands of 55 years is 20·4, while for women of 35 years with husbands of 55 the probable natality is 17·0; if, however, in this latter class of women the age of the husband be reduced to 35 years, the natality is equal to that of women of 25, and with husbands of 25 years the natality of women of 35 is greater than that of women of 25 with middle-aged husbands. When, however, the higher ages are examined it will be seen that compensation to anything like this extent is absent. Thus, the probable births to women of 22 years of age, even with husbands of 60 years is 19·7 per cent., and the same average obtains for women of 27, yet a woman of 39 years has not an equal probability as this, even with the most youthful of husbands. Again, with women of 43 years, the highest natality is 8·7 per cent. with husbands of 30 years of age; this is only half the ratio for women ten years younger with husbands of 60 years of age.

To obtain equal ratios of natality from women of different ages, as the wife's age increases so the husband's must decrease, but with wives under 28 the increase in the husband's age needs not be material; from 28 to 36 years a rapid decrease in the husband's age seems necessary. As the wife's age increases beyond 36 the husband's age should decrease, but less rapidly than at previous ages, and still less rapidly the more the wife's age runs on. To these rules an exception must be made. Generally speaking, the diminution of the husband's age below 28 years does not affect in any appreciable degree the birth-rate, and for women whose ages range from 30 to 40 years, the point of greatest natality is with husbands of about 26 years. After women have passed age 40 their highest natality is with husbands from 26 to 30 years, nevertheless, there is very little difference, whether the husband be 20 or 40 years of age.

Plural Births.

THE plural births in the eight years, 1893–1900, were 3,088 in number, representing 6,207 children. Of these births, 2,936 were legitimate, and 152 illegitimate, viz. :—

	Legitimate.	Illegitimate.
Twins ... ..	2,910	150
Triplets .....	23	2
Quadruplets .....	3	.....

Under ordinary circumstances it would be unscientific to attempt the deduction, from such small numbers, of a law governing the occurrence of plural births ; but in one particular the results are so well marked and agree so well with the observations of other countries that they may be accepted as indicating a general law, viz, that the age of the parents is the chief determining factor in the occurrence of plural births. Whatever part heredity may play in marking out those who are liable to give birth to twins or triplets, it is clear that there is a certain period of age both in males and females, at which there is a greater tendency to produce twins than at other times. For females this period is somewhere between the thirty-fifth and the fortieth year, and for males it is a little later.

In Dr. Matthews Duncan’s work on “Fecundity, Fertility, and Sterility,” some particulars are given regarding the occurrence of plural births, and though Dr. Duncan’s observations were on a limited scale, extending only to 438 cases of plural births, and 32,686 confinements, compared with 3,088 cases of births, and 298,518 confinements in New South Wales, in the absence of more extended statistics his corroboration is valuable, as he fixes the period of greatest frequency of plural births amongst women at the same age as ascertained for New South Wales.

In New South Wales the smallest proportion of plural births is found amongst women below age 20 ; the proportion increases steadily with the age of mothers until it reaches a maximum with women between the ages of 35 and 40 years, after which there is a decline ; but the decline does not bring the ratio back to its starting point, for at ages 45 to 50 the plural births are one to every 117 confinements, whereas at age 20 and under, the proportion is one to 238.



The results of the observations for the eight years are as follows ; the figures refer to legitimate births only :—

Age Group of Mothers.	All Births.	Plural Births.	Plural Births per 1,000 of all Births.
Under 20 years .....	9,978	42	4·21
20 and under 25 years .....	60,070	371	6·18
25     ,,     30     ,,     .....	78,919	734	9·30
30     ,,     35     ,,     .....	64,803	850	13·12
35     ,,     40     ,,     .....	45,681	706	15·46
40     ,,     45     ,,     .....	17,374	218	12·55
45     ,,     50     ,,     .....	1,753	15	8·56

It is a remarkable fact that of 2,936 births, 1,789 occurred to mothers whose ages were 30 years or upwards ; this gives a proportion of 61 per cent., whereas of all legitimate births, only 47 per cent. occurred at those ages ; 72 per cent. of plural births occurred to mothers over 27 years of age, whereas of all births, only 52 per cent. were amongst such mothers. The same preponderance is observable amongst illegitimate births. In the eight years, 19,940 cases of illegitimate births were recorded, thus distributed :—

	All Births.	Plural Births.	Plural Births per 1,000 of all Births.
Women under 28 years .....	15,575	91	5·84
,,     over 28     ,,     .....	4,365	61	13·97

The number of triplets is very small. During the eight years there were only 23 cases out of 278,601 legitimate births ; this represents 83 per million confinements. It is surprising how closely the occurrence of these births is also affected by the age of the mother. Of the triplets, 19 were born to mothers over 30 years of age—that is to say, 83 per cent., whereas, in ordinary births, the proportion of mothers of such age is only 46 per cent. The mothers' ages in the three cases of quadruple births registered in the eight years were 21, 33, and 36.

## Sex.

IN an average year, of every 10,000 children born in New South Wales 5,134 will be males and 4,866 females; the excess of male births is therefore 268, or 5·51 per cent. In no year has the number of females born exceeded that of the males, although the difference has sometimes been very slight. Considering only children born to married women, the proportion of males to every 100 females has varied between 101·71 and 108·06, showing a variation of 6·35. The range in the proportion of the sexes born out of wedlock has been much greater, indeed, in some years, there has been a majority of females; during the past thirty years the proportion of males to females amongst illegitimates has varied between 94·96 and 121·96, showing a range of 27 per cent., although, strange to say, the average is only 103·41 males to 100 females, whereas among legitimate births the average is 105·85.

The following is a statement of the proportion of male to female children of legitimate and illegitimate parentage born during each of the last twenty years :—

Year.	Males per 100 Females.		Year.	Males per 100 Females.	
	Legitimate Births.	Illegitimate Births.		Legitimate Births.	Illegitimate Births.
1882	103·3	101·4	1892	105·3	103·8
1883	104·5	113·3	1893	106·7	105·7
1884	105·7	99·1	1894	105·4	107·1
1885	104·9	103·5	1895	104·6	114·1
1886	106·7	98·7	1896	105·6	95·4
1887	103·5	95·3	1897	103·9	105·4
1888	104·2	96·2	1898	107·2	104·0
1889	108·1	100·7	1899	104·0	108·2
1890	104·2	104·7	1900	104·4	103·2
1891	107·0	105·7	1901	101·8	108·5

The influence of the age of parents upon the sex of their offspring is a matter that has been much discussed. As just pointed out, the male births always exceed the female births, and this excess is found at almost all ages of parents, and the exceptions to the rule do not cover many cases. The sex of children born in New South Wales has been compared with the age of the parents, and certain general rules may be deduced therefrom. It would appear that :—

- (a) The youngest children in families, where the mother has continued fruitful up to the age 45 years, are more often girls than boys.
- (b) Where the father is ten years younger than the mother there will be more female births than male.
- (c) Where the father is twenty years or more older than the mother, provided the latter is herself not under 22 years of age nor over 33 years of age, there will be an excess of females born.



- (d) The female births exceed the male as the mother approaches the limit of child-bearing, no matter what the father's age may be.
- (e) Where the mother is very young and the father is also young, the female births slightly exceed the male births.

The number of children born to married couples falling within the foregoing age conditions is not large, and under all other age conditions an excess of male births was recorded.

Taking the average of the last eight years, the proportion of male births to 100 female births was 105·85. For mothers of different ages the proportions were as follow :—

Mother's Age.	Average Male Children born to 100 Females.	Mother's Age.	Average Male Children born to 100 Females.	Mother's Age.	Average Male Children born to 100 Females.
14	77	26	106·5	38	105
15	89	27	106·5	39	104
16	96	28	106·5	40	104
17	102·4	29	106·5	41	104
18	105	30	106	42	104
19	106	31	106	43	103
20	106	32	106	44	102
21	106·5	33	106	45	101
22	106·5	34	106	46	100
23	106·5	35	106	47	100
24	106·5	36	105	48	99
25	107	37	105		

The highest average rate, viz., 107, is therefore at 25 years. All ages from 17 to 47 show a larger proportion of male than female births, those outside these limits show a less proportion.

There is much less range in the proportion of male children when the father's age is the basis of comparison. For fathers up to 65 years there is an excess at every age of male births, after 65 years the contrary appears to be true, and for age groups 65–70 the proportion is only 85·8 per hundred, but the number of fathers of this age is inconsiderable.

If the ages of both parents be made factors of a comparison, a much wider range in the proportions of male and female births is disclosed. The highest proportion (124·7) for any age group is for mothers aged 20 years with fathers of 42 years, that is to say, for the youngest mothers for whom there are statistics, and the oldest group of fathers married to women of that particular age. The lowest proportion of male births, 63·1 per hundred females, is found amongst women of 45 years with husbands of 33; these ages represent the oldest woman's age for which there are observations and the youngest group of fathers with women of that age.

The proportion of male births to 100 female births to women of the ages specified are given for husbands from 23 to 60 years. Wives below 20 years have been omitted, and no proportions are set against ages where the number of couples was too small to admit of a proper average being obtained.

PROPORTION of Male Children out of 100 Births to Parents aged as under :—

Father's Age.	Mother's Age.				Mother's Age.	Father's Age.			
	20 years.	25 years.	35 years.	45 years.		25 years.	35 years.	45 years.	65 years.
20	48·7	...	...	...	20	51·0	54·0	...	...
21	49·1	...	...	...	21	51·2	53·4	...	...
22	49·6	...	...	...	22	51·3	52·8	...	...
23	50·0	51·3	...	...	23	51·5	52·2	50·4	...
24	50·5	51·6	...	...	24	51·6	52·2	50·6	...
25	51·0	51·7	...	...	25	51·7	52·2	50·8	...
26	51·4	51·9	...	...	26	51·8	52·2	51·0	...
27	51·8	52·1	50·4	...	27	51·9	52·2	51·3	...
28	52·0	52·0	50·6	...	28	51·7	52·2	51·5	...
29	52·3	52·1	50·6	...	29	51·6	52·1	51·5	...
30	52·6	52·1	50·9	...	30	51·4	52·0	51·6	...
31	53·0	52·1	51·0	...	31	51·3	51·9	51·7	...
32	53·2	52·1	51·0	...	32	51·1	51·8	51·8	...
33	53·4	52·1	51·2	38·7	33	50·9	51·7	51·9	...
34	53·7	52·2	51·3	39·5	34	...	51·6	52·0	...
35	54·0	52·2	51·4	40·5	35	...	51·4	52·1	...
36	54·4	52·2	51·5	41·7	36	...	51·3	52·2	...
37	54·6	52·2	51·5	42·6	37	...	51·1	52·3	...
38	54·8	52·1	51·6	43·5	38	...	50·9	52·5	54·1
39	55·0	52·1	51·7	44·3	39	...	51·1	52·2	52·0
40	55·2	52·1	51·8	45·0	40	...	51·4	51·9	49·9
41	55·3	51·9	51·8	45·9	41	...	51·7	51·6	47·8
42	55·5	51·8	51·9	46·4	42	...	52·0	51·3	45·7
43	...	51·6	52·0	47·0	43	...	48·2	50·2	43·6
44	...	51·3	52·0	47·6	44	...	44·4	49·1	41·5
45	...	50·8	52·1	48·0	45	...	40·5	48·0	39·5
46	...	50·3	52·1	48·5					
47	...	49·7	52·1	49·0					
48	...	49·4	52·2	49·5					
49	...	48·3	52·2	50·0					
50	...	47·3	52·2	50·2					
51	...	46·2	52·1	50·5					
52	...	45·0	52·3	50·8					
53	...	...	52·0	50·9					
54	...	...	...	50·9					
55	...	...	...	50·8					
56	...	...	...	50·6					
57	...	...	...	50·2					
58	...	...	...	49·6					
59	...	...	...	49·0					
60	...	...	...	48·0					
61	...	...	...	47·0					
62	...	...	...	46·0					
63	...	...	...	44·0					
64	...	...	...	42·0					
65	...	...	...	39·5					



## Deaths in Child-birth.

THE statistics of all countries are deficient in particulars concerning deaths of women in child-birth—the actual number of such deaths is, of course, known wherever vital statistics are published, but the more important details are singularly wanting, and the statistics of New South Wales are now, as regards this particular branch of enquiry, in all important respects, as complete as any yet published. Nevertheless, even the New South Wales figures could be improved. One-fourth of all deaths are ascribed to “other casualties of child-birth,” and at the very threshold of his enquiry the investigator is met with defective information. This faulty definition is due to want of thought on the part of medical attendants in furnishing the certificates required by law, the cause of death certified to by them being simply “child-birth,” which, in most cases, means one or other of the specific causes enumerated in the Table ; but even of this there can be no certainty, and in this connection it may not be out of place to remark that many of the difficulties of the statistician in dealing with vital statistics arise from the careless manner in which medical men render their death certificates.

During the eight years which closed with 1900 there were in New South Wales 2,138 deaths due to child-birth ; of these 1,927 were of married women and 211 of single women. The assigned causes were as shown below :—

Cause of Death.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	Total 1893-1900.
Abortion .....	5	12	11	11	26	16	20	18	119
Miscarriage .....	19	21	26	27	32	20	32	33	210
Puerperal fever .....	67	110	111	81	113	92	82	75	731
Puerperal mania .....	3	4	1	5	3	1	3	2	22
Puerperal convulsions .....	22	28	23	27	32	31	35	28	226
Placenta praevia-flooding ...	36	30	40	36	39	37	44	39	301
Phlegmasia dolens.....	3	1	2	1	4	...	2	1	14
Other casualties of Child-birth.	66	61	64	61	72	59	60	72	515
Total.....	221	267	278	249	321	256	278	268	2,138

During this period there were 278,601 confinements of married women, and 19,940 of unmarried women, so that the death-rate amongst the former class was 1 in 145, and amongst the latter 1 in 95.

The two important considerations in dealing with the risk at child-birth, are the age of the mother and the number, if any, of her previous confinements. The following table gives a distribution of the confinements according to previous issue, and the number of deaths in each class. This

interesting grouping can be given only for married women, the registrations not affording particulars of the previous issue of the unmarried :—

Number of Confinement.	Births.	Deaths in Child-birth.	Number of Confinement.	Births.	Deaths in Child-birth.
1 .....	56,247	495	14 .....	689	4
2 .....	45,928	215	15 .....	349	4
3 .....	38,783	212	16 .....	142	1
4 .....	32,208	169	17 .....	74	1
5 .....	26,783	184	18 .....	23	2
6 .....	21,720	137	19 .....	14	.....
7 .....	17,422	130	20 .....	4	.....
8 .....	13,486	126	21 .....	.....	.....
9 .....	9,699	101	22 .....	1	.....
10 .....	6,739	53	23 .....	3	.....
11 .....	4,381	38	Total.. ...	278,601	1,927
12 .....	2,541	30			
13 .....	1,365	25			

The number of confinements of each class up to the thirteenth is sufficiently large to enable the probability of a death to be determined; the values given hereunder for this probability are those obtained direct from the statistics, together with the results after adjustment :—

Number of Confinement.	Probability of Death during Confinement.		Number of Confinement.	Probability of Death during Confinement.	
	Unadjusted.	Adjusted.		Unadjusted.	Adjusted.
1 .....	·00880	·00880	8 .....	·00934	·00816
2 .....	·00468	·00468	9 .....	·01041	·00900
3 .....	·00547	·00512	10 .....	·00786	·01000
4 .....	·00525	·00552	11 .....	·00867	·01128
5 .....	·00687	·00606	12 .....	·01181	·01326
6 .....	·00631	·00672	13 .....	·01832	·01740
7 .....	·00746	·00736			

These figures show one element of the risk of dying in child-birth, and, taking all women, it would appear that the risk attending the first confinement is greater than at any subsequent confinement up to the ninth; the minimum, ·00468, is at the second; but at the third confinement the risk is not much greater. The element of age is, however, so important that it will be necessary to discuss the question of risk in relation both to the number of previous confinements and the age attained.

First Confinements.

The risk of a mother dying at or within a month of her first confinement is greater than at any subsequent one up to but not including the ninth.



About one-half of all the first confinements occur to mothers under 24 years of age, and three-fourths to women under 27 years. If the confinements and deaths be arranged according to age, the importance of age as an element of risk will be at once apparent. The following statement applies to married women only :—

Age of Mothers.	Number of First Confinements.	Number of Deaths in Child-birth.	Age of Mothers.	Number of First Confinements.	Number of Deaths in Child-birth.
Years.			Years.		
Under 18	1,549	11	33	717	15
18	2,504	21	34	535	9
19	3,935	29	35	482	9
20	4,408	23	36	415	4
21	5,676	39	37	272	5
22	5,942	44	38	260	4
23	5,621	46	39	194	1
24	4,816	35	40	155	3
25	4,188	35	41	60	2
26	3,560	28	42	77	1
27	2,897	24	43	37	2
28	2,461	25	44	24	2
29	1,835	29	45 and over	32	2
30	1,614	21	Not stated	4	—
31	1,049	8			
32	928	18	Total .....	56,247	495

Taking all married primiparæ, the number of fatal cases represents one death to 114 confinements, so that the average risk is  $\cdot 0088$ . The risk appears to be least at age 20, the proportion of deaths for ages 18 and 19, the only years below that age available for comparison, being considerably in excess of the rates for the higher age. After age 20 the risk increases slightly for a few years, and at 27 years is no higher than at 18 years; thereafter it mounts up rapidly, and at age 40 it reaches the high proportion of one in 58. The risk of death at each age is as shown below :—

Age of Mother.	Probability of Death at First Confinement.		Age of Mother.	Probability of Death at First Confinement.	
	Unadjusted.	Adjusted.		Unadjusted.	Adjusted.
Years.			Years.		
Under 18	$\cdot 00710$	—	32	$\cdot 01940$	$\cdot 0175$
18	$\cdot 00839$	$\cdot 0084$	33	$\cdot 02092$	$\cdot 0185$
19	$\cdot 00737$	$\cdot 0068$	34	$\cdot 01682$	$\cdot 0184$
20	$\cdot 00522$	$\cdot 0061$	35	$\cdot 01867$	$\cdot 0172$
21	$\cdot 00687$	$\cdot 0062$	36	$\cdot 00964$	$\cdot 0149$
22	$\cdot 00740$	$\cdot 0069$	37	$\cdot 01838$	$\cdot 0132$
23	$\cdot 00818$	$\cdot 0075$	38	$\cdot 01538$	$\cdot 0131$
24	$\cdot 00727$	$\cdot 0077$	39	$\cdot 00515$	$\cdot 0143$
25	$\cdot 00836$	$\cdot 0079$	40	$\cdot 01935$	$\cdot 0172$
26	$\cdot 00787$	$\cdot 0082$	41	$\cdot 03333$	$\cdot 0217$
27	$\cdot 00828$	$\cdot 0087$	42	$\cdot 01299$	$\cdot 0282$
28	$\cdot 01016$	$\cdot 0097$	43	$\cdot 05405$	$\cdot 0366$
29	$\cdot 01580$	$\cdot 0113$	44	$\cdot 08333$	—
30	$\cdot 01301$	$\cdot 0123$	45 and over	$\cdot 06250$	—
31	$\cdot 00763$	$\cdot 0155$			

Multiparæ.

The number of confinements of women who had already borne children was during the eight years 222,354, and the number of deaths 1,432. The fatal cases, therefore, represent one to every 155 confinements, being a risk of .00645 compared with .0088 amongst primiparæ; such comparison, however, is of no great value, as the confinements of multiparæ are numerous at ages over 30 years, at which ages first confinements are exceptional.

Distributing the confinements according to the age of the mothers, the following were the numbers thereof, and of the deaths at each age period :—

Age of Mother.	Number of Confinements (Multiparæ).	Number of Deaths in Child-birth.	Age of Mother.	Number of Confinements (Multiparæ).	Number of Deaths in Child-birth.
Years.			Years.		
Under 18 .....	117	.....	27 .....	13,063	65
18 .....	475	2	28 .....	13,769	84
19 .....	1,398	5	29 .....	13,073	61
20 .....	2,740	7	30 and under 35 .....	59,953	408
21 ..	4,632	12	35 ,, 40 .....	44,055	400
22 .....	6,634	28	40 ,, 45 .....	17,020	186
23 .....	8,956	27	45 and over .....	1,743	22
24 .....	10,644	38	Unknown .....	13	.....
25 .....	11,422	36			
26 .....	12,647	51	Total .....	222,354	1,432

From these figures the probability of a death occurring at any age may be deduced. This probability is as shown in the following table :—

Age of Mother.	Probability of Death during Confinement.		Age of Mother.	Probability of Death during Confinement.	
	Unadjusted.	Adjusted.		Unadjusted.	Adjusted.
18 .....	.00421	.00385	32 .....	.00681	.00681
19 .....	.00358	.00340	33 .....	.....	.00732
20 .....	.00255	.00315	34 .....	.....	.00780
21 .....	.00259	.00305	35 .....	.00908	.00826
22 ..	.00422	.00307	36 .....	.....	.00870
23 .....	.00301	.00316	37 .....	.....	.00908
24 .....	.00357	.00330	38 .....	.....	.00950
25 .....	.00315	.00355	39 .....	.....	.00988
26 .....	.00403	.00388	40 .....	.....	.01027
27 .....	.00498	.00430	41 .....	.....	.01062
28 .....	.00510	.00480	42 .....	.01093	.01093
29 .....	.00467	.00530	43 .....	.....	.....
30 .....	.....	.00580	44 .....	.....	... ..
31 .....	.....	.00635			

The age of least risk for multiparæ is 21 years. This is also about the time of least risk for primiparæ, but the probability of death is only about half as



great for women with previous issue as for women without previous issue. It will be seen that the probability of death is considerably greater for women below than at age 20. After 20 years the risk increases with age, but not rapidly until age 26 is reached. Comparing the deaths of primiparæ and multiparæ at the same ages, the superiority of the women who have already been mothers is very noticeable.

Age of Mother.	Probability of Death.	
	Primiparæ.	Multiparæ.
18 .....	·0084	·00385
20 .....	·0061	·00315
25 .....	·0079	·00355
30 .....	·0123	·00580
35 .....	·0172	·00826
40 .....	·0172	·01027

It will be seen that for both classes of women age is the great element in the risk. With multiparæ age brings in a further condition, viz., loss of vitality said to arise out of previous confinements, and it is interesting to determine whether the statistics give evidence of such condition. The following table gives the probability of death in child-birth for mothers of various ages, according to the number of previous issue :—

Age Groups.	Previous Issue.								
	1	2	3	4	5		7	8	9
15-19	·0066	.....	.....	.....	.....	.....	.....	.....	.....
20-24	·0047	·0037	.....	.....	.....	.....	.....	.....	.....
25-29	·0056	·0047	·0041	·0039	·0043	·0049	.....	.....	.....
30-34	·0067	·0065	·0063	·0061	·0062	·0065	·0074	·0087	.....
35-39	·0084	·0085	·0086	·0088	·0092	·0096	·0101	·0107	·0114
40-44	·0109	·0110	·0111	·0113	·0116	·0118	·0121	·0125	·0130
Ages, 15-44	·0053	·0056	·0060	·0065	·0072	·0081	·0092	·0105	·0120

The importance of age, as an element of the risk, is apparent at each confinement, but the figures do not warrant the supposition that, apart from age, each successive confinement is attended with additional risk. The most that can be asserted is that for some women such is the case ; on the other hand, there are a large number to whom the risk of dying is somewhat the same, whether their confinement be the second or the tenth.

## Primiparæ and Multiparæ combined.

A statement of the probability for all married women, primiparæ and multiparæ combined, is not of great interest where, as in New South Wales, it is possible to show the probability for each class separately, but the combined rate is given for purposes of comparison with the statistics of countries where the distinction has not been made. The following statement combines the figures given previously for each class :—

Age of Mother.	Probability of Death during Confinement.		Age of Mother.	Probability of Death during Confinement.	
	Unadjusted.	Adjusted.		Unadjusted.	Adjusted.
Under 18.....	·00660	.....	31.....	.....	·00724
18 .....	·00772	.....	32.....	·00739	·00758
19 .....	·00638	·00612	33.....	.....	·00790
20 .....	·00420	·00534	34.....	.....	·00821
21 .....	·00495	·00485	35.....	.....	·00851
22 .....	·00573	·00464	36.....	.....	·00884
23 .....	·00501	·00460	37.....	·00926	·00918
24 .....	·00472	·00468	38.....	.....	·00953
25 .....	·00455	·00490	39.....	.....	·00994
26 .....	·00487	·00527	40.....	.....	·01037
27 .....	·00558	·00574	41.....	.....	·01081
28 .....	·00672	·00618	42.....	·01128	·01128
29 .....	·00604	·00653	43.....	.....	.....
30 .....	.....	·00690	44.....	.....	.....

## Deaths of Unmarried Women.

There is a difficulty in dealing with the deaths of the unmarried, as the previous issue of such women is not ascertained. It is probable the majority of the unmarried women under 25 years of age are primiparæ; beyond that age it is equally probable there are numerous multiparæ amongst them; indeed the rates themselves indicate this. The total number of confinements of unmarried women was 19,940 and the deaths 211, thus distributed :—

Age of Mother.	Number of Confinements.	Number of Deaths in Child-birth.	Age of Mother.	Number of Confinements.	Number of Deaths in Child-birth.
12 .....	1	.....	25.....	919	12
13 .....	10	1	26.....	786	5
14 .....	64	1	27.....	668	8
15 .....	212	5	28.....	609	3
16 .....	592	8	29.....	511	7
17 .....	1,142	16	30 and under 35 .....	1,710	16
18 .....	1,578	15	35 „ 40 .....	1,110	5
19 .....	1,917	22	40 „ 45 .....	325	2
20 .....	1,883	21	45 and over .....	40	.....
21 .....	1,806	21	Not stated .....	60	.....
22 .....	1,590	17			
23 .....	1,337	16	Total.....	19,940	211
24 .....	1,070	10			



The risk of death at each age was therefore :—

Under 15.....	·02667
15 and under 20.....	·01213
20     ,,     25..	·01106
25     ,,     30.....	·01002
30     ,,     35.....	·00936
35     ,,     40.....	·00450
40 and over.....	·00548

The most noticeable point about these figures is the downward progression of the death probability as age increases, which is an absolute reversal of the experience derived from the deaths of married women. The figures have also another peculiarity, which is, that for women of 35 years of age and upwards, the probability of a death is less amongst the unmarried than amongst the married, and at ages over 30 the probability is less for the unmarried than for married primiparæ.

An explanation of the last point may be found in the fact that unmarried multiparæ may possibly be largely represented amongst the women of the higher ages, but of this there is no certainty, as the law does not require particulars of previous issue where such issue is illegitimate. A reason for the declining ratios of the unmarried may be found in the fact that the women under 25 who, being with child, do not succeed in obtaining marriage from their seducers, are both physically and mentally in a pitiable state, and in most cases bereft of the commonest comforts and conveniences demanded by their condition. Besides this, they are haunted by a dread of exposure, and, in their ignorance, many of them resort to quacks and abortionists.

For the light death-rate amongst unmarried women over 35 years of age, no explanation can be extracted from the statistics. During the eight years, 1893-1900, there were 1,475 confinements of unmarried women of 35 years and upwards and 7 deaths. Amongst married women of the same age there were 64,826 confinements and 643 deaths, the rates for the unmarried being 1 death to 211 confinements, and for the married 1 to 101 confinements. More striking still is the comparison with the married primiparæ; of these over 35 years of age there were 2,008 confinements and 35 deaths, giving a ratio of 1 death to 57 confinements, which is nearly four times as great as for unmarried women. The numbers, both of the unmarried women and the married primiparæ over 35 years of age, are small, and no safe deduction can be drawn from them; it is evident, however, that the unmarried women of mature age who become mothers must be of an exceptional class to be subjected to so few casualties.

## British Mortality Experience.

Prior to the publication of the information now presented, the best statistics on the subject of child-birth were those contained in Dr. Matthews Duncan's well-known work already alluded to. Writing in 1871, Dr. Duncan declared that "not fewer than one in every 120 women, delivered at or near the full time, die within four weeks of childbed." In New South Wales there is, happily, a better though still a high average, for there were 2,138 deaths from 298,541 confinements of married and unmarried women, or one death to 140 confinements. As Dr. Duncan has made the distinction between



primiparæ and multiparæ, a comparison of his results for various ages with those of New South Wales is interesting. This the following table affords :—

Age Groups.	Primiparæ.		Multiparæ.	
	New South Wales.	Dr. Matthews Duncan.	New South Wales.	Dr. Matthews Duncan.
15 and under 20 .....	·00764	·01208	·00352	.....
20 „ 25 .....	·00707	·01291	·00333	·00711
25 „ 30 .....	·00944	·01291	·00464	·00521
30 „ 35 .....	·01466	·02260	·00681	·01115
35 „ 40 .....	·01417	·00746	·00908	·00879
40 „ 45 .....	·02833	.....	·01093	·00991
45 .....	.....	.....	.....	·02174

In a paper read at the 66th annual meeting of the British Medical Association, held in Edinburgh, Dr. J. Playfair and Mr. T. Wallace gave statistics of the deaths in the Royal Maternity and Simpson Memorial Hospitals at Edinburgh. For married primiparæ they found the death-rate to be ·02053, or one death to 49 confinements; and for married multiparæ the death-rate was ·0056, or one death to 179 confinements, in both cases very much higher than the rates ascertained for New South Wales; but the experience afforded by a hospital is too small to warrant definite conclusions being drawn from it.

### Comparative Death Rates since 1860.

Extremely important modifications have taken place in the birth rates of New South Wales during recent years, indicative of a radical change either in the physical condition or in the habits of the people. No changes of the kind could take place without being reflected, in a greater or less degree, in the death rates of married women, and it would be interesting, therefore, to compare the ratio of deaths as now ascertained with those of past years. It is, unfortunately, impossible to make such comparison with certainty of its accuracy, at all events, for years prior to 1893. It is true that the causes of deaths have been officially registered for over forty years, but there has been great negligence by medical men in filling up the certificates required by law. Since 1893 the death certificates have been carefully scrutinized, and the statistics compiled with the most patient care, but previous to that year, when deaths occurred in child-birth, there seemed reluctance in many instances to state specifically the fact, and various ill-defined descriptions of the cause of death have been returned and accepted by the registration office, and where a defined cause has been given, the important qualification *puerperal* has been omitted in a large number of cases, especially of septicæmia and peritonitis. This reluctance to acknowledge the true cause of death is not confined to New South Wales, and statements for any country indicating a more favourable general death-rate than one in one hundred and seventy should be received with caution.

What has just been said must, therefore, be borne in mind in considering the following figures, which purport to show the ratio of deaths in child-birth since 1870 for the state of New South Wales :—

Period.	Ratio.
1870-80 .....	·004891
1881-90 .....	·004309
1891-1900 .....	·006509



It would be idle, at this late stage, to attempt to correct the understatements in the number of deaths from child-birth during the years prior to 1890, but every argument founded on reason or probability would lead to the conclusion that the rates of recent years should show a marked decline. Medical attendance, skilled nursing and medical comforts, are now within the reach of most women; twenty-five years ago this was certainly not the case, and doubtless many lives were then lost that now would be saved. Yet, making every possible correction for errors of registration, the rates of 1870-1880 cannot be brought up to the level of those of recent years, and it must be admitted that deaths from child-birth have increased during the last twenty years. This result is a curious satire on the efforts of science to ameliorate the condition of the mothers of our race. So curious, indeed, is the result that the question at once arises—is there not some cause for the increase in the death-rate of parturient women tending to neutralize all that science and skill can do in their behalf. The statistics do not enable an absolutely satisfactory answer to be given to this question, but they certainly indicate, as a distinct probability, that the increase in the death-rate of child-bearing women is associated with the decline in the birth-rate.

Two apparently opposite causes are in operation and bring about a like result. The failure to bear children is conspicuously prevalent amongst women of the well-to-do classes and amongst those whose circumstances permit them to provide everything that would tend to ameliorate the condition and safeguard life during the critical period. Amongst women not so fortunately situated as regards material comforts, there is less restriction, and these are the mothers to whom the danger of death is greatest. The failure to bear children of women whose confinements would be attended with the minimum of danger increases the apparent average risk to all women, although as a matter of fact, the real risk may not have increased.

The second cause affecting the death-rates arises out of the practice of restriction, and is deserving of very serious consideration. It will have been seen that absolute infecundity does not account for any large part of the decline in the birth-rate. The great majority of married women still bear children, but many of them do so with reluctance, and make the interval between the births of successive children as great as possible. To accomplish their purpose, measures are taken by some which are inconsistent with the future safe delivery of another child, and it is amongst these women that the casualties take place which swell the death-roll and make the present rate so high.

## Conclusion.

It cannot be denied that the condition of affairs disclosed by several of the preceding chapters arises from a direct reversal of the ordinary canons of morality. It is not, however, to be supposed that the practices of which this condition is the evidence are peculiar to Australia; on the contrary, it is probable they are just as rife in other countries, but, owing to the absence of statistics, there is no exact measure of the extent to which they are indulged in.

Many persons have been unwilling to accept what appears to be the obvious cause of the decline in the birth-rate as the actual cause, and, falling back upon the theory of the tendency of cerebral development to lessen fertility, have sought in this tendency an explanation of the decline in the birth-rates in Australia as well as in other countries. The theory of decreased fertility due to cerebral development found wide acceptance in England some thirty years ago, when Greig's "Enigmas of Life" was first published; it was especially agreeable to the very large number of persons wishful to escape from the dire logic of Malthus, and to "justify the ways of God to men" in some other manner than by supposing that the incurable tendency of population to increase faster than its sustenance could be counteracted only by vice, misery, or moral restraint. The general question of the effect of cerebral development upon fecundity need not be discussed here; whether it is true or not, cannot be ascertained from any statistics yet collected in Australia. It is obvious, however, that the cerebral development of a race is a matter of slow growth, and to explain the decline in the birth-rate by reference to this cause is to neglect certain very obvious facts. For many years the Australian birth-rate was high, but within a certain short period between the years of 1880 and 1890, there was a complete change to a low rate. This change was manifest in all classes of the community, except amongst women of Irish birth, amongst people of every shade of opinion and of every social condition. Changes in cerebral development are not thus rapid in their operation nor so widespread in their range. Moreover, it is doubtful if the conditions which make for cerebral development have had much effect on the great bulk of the community during the last two generations, notwithstanding the spread of elementary instruction. The existing facts are compatible with only one explanation, viz., that in the years following 1880 the art of applying artificial checks to conception was successfully learnt and has continued in operation to this day. Nor are there any present signs that the lessons thus learnt are likely to be forgotten. The improvement in the material condition of the country may favourably affect the birth-rate, mainly by bringing about an increase in marriage, but also because it happens that, amongst certain classes, the women are willing to bear children when the prospect of their maintenance is in sight. The risk of death in child-bed when conception takes place after a long period of artificial repression, may also have effect in dissuading some against an indulgence in this practice, while strong measures against professional abortionists would beneficially affect alike the birth-rate and the moral tone of the community.



As bearing upon the subject of child-birth, it may be mentioned that the conditions of life in Australia necessitate much separation of husbands and wives. On the night of the Census of 1901, 30,379 husbands out of 206,186 in New South Wales were not under the same roof with their wives, and this is the habitual condition throughout Australia. The advent of more settled life will prevent this breaking up of families and conduce to a higher birth-rate. But at best, these remedies, if operating to their full extent, would not go far to restore the former birth-rate, nor would anything be effective unless a radical change takes place in the mental and moral attitude of women towards child-bearing.

There are, however, conditions which are certain to operate adversely to an improvement in the birth-rate. It is possible that there may be a great moral improvement in the relations of men and women before marriage. This would mean a decline in the number of ante-nuptial conceptions, and as ante-nuptial conceptions are a great factor in keeping up the marriage-rate, any reduction in their numbers would be attended by a further fall in the marriage-rate, and, as a consequence, in the birth-rate also. Another factor tending towards a decrease in the proportion of births is the decline in the Irish element of the population. It will have been seen in the chapter dealing with the subject, that amongst mothers of Irish birth the number of children to a marriage has remained much the same as formerly, whilst amongst all other women there has been a great decline. Wherever women of Irish birth are numerous the birth-rate has been higher than elsewhere, but, as the proportion of Irish women is fast decreasing, this element in the maintenance of the birth-rate will presently disappear.

Large as is the area of the Australian continent, it is impossible that its people will ever become truly great under the conditions affecting the increase of population which now obtain. Immigration has practically ceased to be an important factor, the maintenance and increase of population depending upon the birth-rate alone, a rate seriously diminished and still diminishing. No people has ever become great under such conditions, or, having attained greatness, has remained great for any lengthened period. The problem of the fall in the birth-rate is, therefore, a national one of overwhelming importance to the Australian people, perhaps more than to any other people, and on its satisfactory solution will depend whether this country is ever to take a place amongst the great nations of the world.





















